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TRANSACTIONS

—OF—

The National Association of Cotton Manufacturers.

SUCCESSOR TO

New England Cotton Manufacturers' Association,

ORGANIZED AS THE HAMPDEN COUNTY SPINNERS' ASSOCIATION

Founded 1854. Incorporated Dec. 1, 1894.

NO. 80.

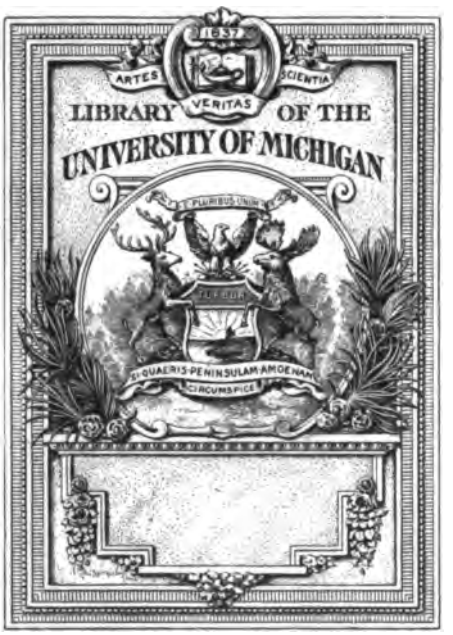
ANNUAL MEETING.

Held in Huntington Hall, of the Institute of Technology,
491 Boylston Street, Boston, Mass.,

APRIL 25 and 26, 1906.

Office of the Association:
Room 57, International Trust Building, 45 Milk Street,
Corner of Devonshire St., Boston, Mass.

1906.



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ENTERED ACCORDING TO ACT OF CONGRESS
IN THE YEAR 1906
BY THE NATIONAL ASSOCIATION OF COTTON MANUFACTURERS,
IN THE OFFICE OF THE LIBRARIAN OF CONGRESS
AT WASHINGTON.

By vote of the Board of Government, the price of the *Transactions* is $5.00 per copy to non-members. The price of this issue and the one previous is $1.00 each to members, and the prices of copies previous to Volume 61, is 50 cents to members but each member is entitled to a copy as a part of the privilege of membership.

CHARTER.

No. 6091.

Commonwealth of Massachusetts.

BE IT KNOWN, That whereas, EDWARD W. THOMAS, C. J. H. WOODBURY, WILLIAM J. KENT, F. M. MESSENGER, HARRY T. WHITIN, ARTHUR H. LOWE, ALBERT F. KNIGHT, ALFRED M. GOODALE, FRED C. MCDUFFIE and GEORGE W. BEAN have associated themselves with the intention of forming a corporation under the name of the NEW ENGLAND COTTON MANUFACTURERS' ASSOCIATION, for the purpose of encouraging scientific investigation and experiment as to the methods of manufacturing cotton; collecting and imparting information relating to this industry, promoting social intercourse among its members; and establishing and maintaining a library of works on textiles in the city of Boston, and have complied with the provisions of the Statutes of this Commonwealth in such case made and provided, as appears from the certificate of the President, Treasurer and Directors of said corporation, duly approved by the Commissioner of Corporations, and recorded in this office.

Now, Therefore, I, WILLIAM M. OLIN, Secretary of the Commonwealth of Massachusetts, do hereby certify that said EDWARD W. THOMAS, C. J. H. WOODBURY, WILLIAM J. KENT, F. M. MESSENGER, HARRY T. WHITIN, ARTHUR H. LOWE, ALBERT F. KNIGHT, ALFRED M. GOODALE, FRED C. MCDUFFIE and GEORGE W. BEAN, their associates and successors, are legally organized and established as and are hereby made an existing corporation under the name of the

NEW ENGLAND COTTON MANUFACTURERS' ASSOCIATION,

with the powers, rights and privileges, and subject to the limitations, duties and restrictions which by law appertain thereto.

Seal of the Commonwealth of Massachusetts.

Witness my official signature hereunto subscribed, and the seal of the Commonwealth of Massachusetts hereunto affixed this first day of December, in the year of our Lord one thousand eight hundred and ninety-four.

WILLIAM M. OLIN,

Secretary of the Commonwealth.

197080

Commonwealth of Massachusetts.

(Acts of 1895, Chap. 163.)

AN ACT TO AUTHORIZE THE NEW ENGLAND COTTON MANUFACTURERS' ASSOCIATION TO HOLD ITS MEETINGS WITHOUT THE COMMONWEALTH.

Be it enacted, etc., as follows:

SECTION 1. The New England Cotton Manufacturers' Association is hereby authorized to hold its meetings in any state or territory of the United States and in the District of Columbia; provided, however, that its annual meeting shall be held in this Commonwealth at least once in five years.

SECT. 2. This act shall take effect upon its passage. [Approved March 23, 1895.]

No. 252.

Commonwealth of Massachusetts.

BE IT KNOWN that whereas

NEW ENGLAND COTTON MANUFACTURER'S ASSOCIATION,

a corporation organized under the laws of this Commonwealth and subject to the provisions of chapter one hundred and twenty-five of the Revised Laws has complied with the provisions of chapter one hundred and nine of the Revised Laws, as appears from the certified copy of the order of the Commissioner of Corporations, authorizing said corporation to change its name and adopt the name of

THE NATIONAL ASSOCIATION OF COTTON MANUFACTURERS,

and the certificate of the Vice-President and Acting President, Treasurer and Directors of said corporation duly filed in this office pursuant to the provisions of section ten of the aforesaid chapter one hundred and nine of the Revised Laws.

NOW THEREFORE, I, William M. Olin, Secretary of the Commonwealth of Massachusetts, DO HEREBY CERTIFY, that the name which said corporation shall bear is

THE NATIONAL ASSOCIATION OF COTTON MANUFACTURERS,

which shall hereafter be its legal name.

Seal of the Commonwealth of Massachusetts.

WITNESS my official signature hereunto subscribed, and the Great Seal of the Commonwealth of Massachusetts hereunto affixed this twenty-fifth day of June in the year of our Lord one thousand nine hundred and six.

WM. M. OLIN,
Secretary of the Commonwealth.

THE

NATIONAL ASSOCIATION OF COTTON MANUFACTURERS.

SUCCESSOR TO

NEW ENGLAND COTTON MANUFACTURERS' ASSOCIATION.

FOUNDED 1854.

INCORPORATED DECEMBER 1, 1894.

CONSTITUTION AND BY-LAWS.

ACTIVE MEMBERS.

ARTICLE 1. Any person who is actively engaged as President, Treasurer, Agent, Superintendent or Manager in the manufacture, printing or finishing of cottons shall be eligible for active membership.

ELECTION OF MEMBERS.

ARTICLE 2. All nominations for membership shall be made in writing, at least one week before the date of any regular meeting, and shall be considered by the Board of Government, and reported to the meeting, favorably or adversely, for the action of the Association. *Provided*, that in case the Board shall decide to report adversely upon any nomination, the member who shall have made it shall be informed of the intention so to report, in order that he may have an opportunity to withdraw the name. Upon such report active members may be admitted, if they obtain a majority of votes of the members present and voting therefor, by acceptance in writing, and paying an admission fee of ten dollars, and maintaining their membership by the payment of an annual assessment not exceeding ten dollars.* Any member failing to pay two successive assessments shall cease to be a member at the end of six months from the date when such second assessment shall become due. Any member may withdraw from the Association upon payment of all arrearages, first giving notice of his intention so to do, in writing, to the Secretary, and the Board of Government may

* This assessment has never exceeded five dollars for active members and ten dollars for associate members.

accept such resignation; and any member may be expelled for cause, at any regular meeting, two-thirds of the members present voting therefor.

ASSOCIATE MEMBERS.

ARTICLE 3. Persons engaged in the manufacture of cotton or cotton fabrics, or the manufacture of textile machinery, or industries kindred to the cotton manufacture, may become associate members of the Association. The methods of application, nomination, election and withdrawal from the Association being under the same conditions as those provided for active members in Article 2 excepting that this class of membership does not carry with it the privilege of voting or speaking, except by permission from the Board of Government or a vote of the Association to allow permission.

The initiation fee for associate members shall be twenty-five dollars, and the annual assessment shall be double the sum annually voted for active members.

Associate members may be expelled by a majority vote of the Board of Government.

HONORARY MEMBERS.

ARTICLE 4. Honorary members may be elected, when recommended by the Board of Government, at any regular meeting of the Association, who shall be enrolled as such, and shall be entitled to attend the meetings of the Association and participate in its proceedings, without the right to vote. They shall not be subject to payment of admission fees or assessments. No person actively engaged in cotton manufacture shall be eligible to honorary membership.

LIFE MEMBERS.

ARTICLE 5. Any active or associate member by the single payment of one hundred dollars shall be exempt from all future payments for dues and shall become a life member having all the privileges of active members.

All moneys thus paid shall be invested as a permanent fund by the Treasurer acting under the direction of the Board of Government, of which the income only shall be subject to appropriation for current expenses.

ARTICLE 6. It shall be the duty of all members of the Association to make returns to the Secretary of such statistics as may be called for by him, under the direction of any committee duly appointed for the collection of statistics, when not incompatible with private interests.

OFFICERS.

ARTICLE 7. The officers of this Association shall be a President, two Vice-Presidents, nine Directors, a Treasurer, Secretary, and Auditor of Accounts.

ELECTION OF OFFICERS.

ARTICLE 8. At each annual meeting there shall be chosen by ballot a President, two Vice-Presidents and three Directors; the President and Vice-Presidents to serve one year, and the three Directors shall be chosen for terms of three years, unless sooner removed as hereinafter provided.

DUTIES OF OFFICERS.

ARTICLE 9. The President, or in his absence the senior Vice-President present, shall preside at all meetings of the Association and of the Board of Government. All officers shall hold their respective offices until their successors shall be chosen and accept their positions.

ARTICLE 10. The President, Vice-Presidents and Directors shall constitute a Board of Government, and have under their care and direction all matters pertaining to the management of the Association; and five of their number shall constitute a quorum for the transaction of business. Meetings of the board may be called by the President, at such time and place as he may deem expedient, giving each member a written or printed notice of the same at least five days before the day of meeting. At their first meeting the board shall elect a Treasurer, Secretary, and Auditor of Accounts for the year ensuing, and fix the amount of compensation of the Secretary. All vacancies in their board occasioned by death or resignation or removal, shall be filled by the board; and the persons so elected shall hold their offices until the next annual meeting except as hereinafter provided. The board may, from time to time, as they shall deem expedient, appoint committees, from among their own board or from the members at large, to collect statistical information, examine new inventions or processes in manufacturing goods, as also to prepare essays on subjects of interest to the Association.

ARTICLE 11. The Treasurer shall keep a book in which all receipts and payments of money shall be entered, collect all moneys due the Association, and disburse the same upon the written order of the Board of Government. At the annual meeting in each year he shall make an exhibit of his accounts, or oftener if the Board of Government require it. He shall notify the members of assessments voted, and cause them to be collected in a reasonable time.

ARTICLE 12. The Secretary shall attend all meetings of the Association and of the Board of Government, and keep accurate records of their doings. In the absence of the Secretary at any meeting, a Secretary *pro tem.* may be appointed by the presiding officer, who shall be sworn to do all things, while in office, required of the Secretary.

ARTICLE 13. The Auditor shall examine the accounts of the Treasurer annually, and report at each meeting the state of the finances.

ARTICLE 14. Any officer who shall unreasonably absent himself from three consecutive meetings of the Board of Government of which he is a member, or shall otherwise neglect or refuse to perform the duties of his office, may be removed from office at any regular meeting of the Board of Government by a vote of a majority of the members present and voting thereon, a notice of such proposed action to be sent to him by mail at least one week previous to the meeting.

MEETINGS.

ARTICLE 15. The annual meeting of the members of the Association shall be held on the last Wednesday of April, or at such other time, and at such hour and place as the Board of Government may appoint. There shall also be a semi-annual meeting of the Association on the last Wednesday of October, in each and every year, or at such other time, and at such place and hour as the Board of Government may appoint.

Special meetings may be called by the Board of Government whenever they deem it expedient, or upon the written application of any ten members, made to the Secretary.

ARTICLE 16. All meetings of the members of the Association shall be in pursuance of a written or printed notice, addressed to each member, with the name of the President or Secretary attached thereto, and deposited in the Post Office ten days at least before the day of meeting, specifying the time and place of meeting; and at all such meet-

ings fifteen members shall constitute a quorum for the transaction of business.

ARTICLE 17. Amendments to the By-Laws may be made at any stated meeting of the Association by a two-thirds vote; *provided*, notice of such proposed amendment be given in writing at a previous meeting, and also notice be given to each member by the Secretary, of the pendency of such amendment, ten days at least before any such meeting.

AMENDMENT TO CONSTITUTION AND BY-LAWS.

The following amendment was adopted at the seventy-fifth meeting of the Association, September 30, 1903:

"ARTICLE 5. Any active or associate member by the single payment of one hundred dollars shall be exempt from all future payments for dues and shall become a life member having all the privileges of active members.

All moneys thus paid shall be invested as a permanent fund by the Treasurer acting under the direction of the Board of Government, of which the income only shall be subject to appropriation for current expenses.

All articles of the Constitution and By-Laws, beginning with Article 5, shall be increased in number to the next cardinal number."

BOARD OF GOVERNMENT.

1906.

PRESIDENT.

JAMES R. MacCOLL, ... PROVIDENCE, R. I.

VICE-PRESIDENTS.

WILLIAM D. HARTSHORNE, . . LAWRENCE, MASS.
GEORGE A. AYER, ... EASTHAMPTON, MASS.

DIRECTORS.

ROBERT BEATTY, ... PHILEDELPHIA, PA.
CHRISTOPHER P. BROOKS, . . . NEW BEDFORD, MASS.
GEORGE OTIS DRAPER, . . . HOPEDALE, MASS.
GEORGE P. GRANT, JR., . . . FITCHBURG, MASS.
FRANKLIN W. HOBBS, . . . BOSTON, MASS.
WILLIAM H. LOFTUS . . . . NEWARK, N. J.
HENRY F. MANSFIELD, . . . UTICA, N. Y.
ROSCOE S. MILLIKEN, . . . NASHUA, N. H.
CHARLES T. PLUNKETT, . . . ADAMS, MASS.

AUDITOR.

C. E. ROBERTS, ... BOSTON, MASS.

SECRETARY AND TREASURER.

C. J. H. WOODBURY, P. O. Box 3672, BOSTON, MASS.

OFFICE OF THE ASSOCIATION:

ROOM 57, INTERNATIONAL TRUST BUILDING, 45 MILK STREET, CORNER OF DEVONSHIRE STREET, BOSTON, MASS.

OFFICERS OF THE ASSOCIATION,

FROM THE FIRST ORGANIZATION.

PRESIDENTS.

Ezekiel A. Straw,	1865–78	A. M. Goodale,	1895–96
Amos D. Lockwood,	1878–80	Arthur H. Lowe,	1896–97
John Kilburn,	1880–83	Russell W. Eaton,	1897–98
William C. Lovering,	1883–85	Stephen A. Knight,	1898–99
Richard Garsed,	1885–86	Frederick E. Clarke,	1899–99
J. S. Ludlam,	1886–88	D. M. Thompson,	1900–01
Henry F. Lippitt,	1888–89	Charles H. Fish,	1901–03
Walter E. Parker,	1889–92	H. E. Walmsley,	1903–05
Robert McArthur,	1892–94	James R. MacColl	1905–
Edw. W. Thomas,	1894–95		

VICE-PRESIDENTS.

Amos D. Lockwood,	1865–77	Simeon B. Chase,	1891–93
William A. Burke,	1865–73	E. W. Thomas,	1892–94
John C. Palfrey,	1873–76	A. M. Goodale,	1893–95
Edward Atkinson,	1876–78	William J. Kent,	1894–97
A. G. Cumnock,	1877–80	Fred. C. McDuffie,	1895–00
Charles Nourse,	1878–81	Henry T. Whitin,	1897–00
William F. Goulding,	1880–83	C. H. Richardson,	1900–01
Richard Garsed,	1881–85	George H. Hills,	1900–02
J. S. Ludlam,	1883–86	H. E. Walmsley,	1901–03
Walter E. Parker,	1885–89	Alfred E. Adams,	1902–03
Richard B. Borden,	1886–88	James R. MacColl,	1903–05
Arnold B. Sanford,	1888–91	W. D. Hartshorne,	1903–
Robert McArthur,	1889–92	George A. Ayer,	1905–

DIRECTORS.

J. S. Davis,	1865–69	E. W. Thomas,	1888–92
Charles Nourse,	1865–78	William W. Whitin,	1888–93
Phineas Adams,	1865–74	Robert R. Smith,	1889–92
William P. Haines,	1865–69	Alfred M. Goodale,	1890–93
Thomas J. Borden,	1865–78	William J. Kent,	1891–94
Daniel D. Crombie,	1865–68	Herman F. Straw,	1891–93
A. M. Wade,	1868–69	Fred C. McDuffie,	1892–95
D. J. Johnston,	1869–70	George W. Bean,	1892–95
F. E. Clarke,	1869–75	F. M. Messenger,	1893–95
A. G. Cumnock,	1869–77	Albert F. Knight,	1893–99
Cyrus I. Barker,	1875–80	Arthur H. Lowe,	1894–96
Hervey Kent,	1877–81	Henry T. Whitin,	1894–97
David J. Johnston,	1878–82	Herbert L. Pratt,	1895–98
Walter Paine, 3d,	1878–80	Stephen A. Knight,	1895–98
Chas. L. Lovering,	1878–83	John Eccles,	1895–99
Richard Garsed,	1880–81	Russell W. Eaton,	1896–97
William H. Jennings,	1880–83	C. H. Richardson,	1897–00
Chas. D. McDuffie,	1881–83	George H. Hills,	1897–00
Walter E. Parker,	1881–85	John T. Meats,	1898–01
John W. Danielson,	1881–85	Alfred E. Adams,	1899–02
William E. Barrows,	1882–83	A. Tenny White,	1899–02
Rufus A. Maxfield,	1883–86	Charles H. Fish,	1900–01
George W. Weeks,	1883–86	Herbert E. Walmsley,	1900–01
Henry S. Howe,	1883–87	Wm. D. Hartshorne,	1901–03
Richard B. Borden,	1883–86	James R. MacColl,	1901–03
O. S. Brown,	1885–91	Geo. F. Whitten,	1898–04
Henry F. Lippitt,	1885–88	W. B. Smith Whaley,	1901–04
Wilbur A. Stiles,	1886–88	J. R. Montgomery,	1902–05
Robert McArthur,	1886–89	Wm. D. Pennell,	1902–05
Stephen N. Bourne,	1886–91	George A. Ayer,	1904–05
John Kilburn,	1870–80	P. A. Mathewson,	1903–06
William P. Haines,	1874–78	George P. Grant, Jr.,	1903–
S. S. Spencer,	1887–90	Christopher P. Brooks,	1904–

DIRECTORS.— Continued.

William H. Loftus,	1905–	George Otis Draper,	1906–
Roscoe S. Milliken,	1905–	Robert Beatty,	1906–
Charles T. Plunkett,	1905–	Henry F. Mansfield,	1906–
Franklin W. Hobbs,	1906–		

AUDITORS.

Benjamin Saunders,	1865–71	J. Herbert Sawyer,	1882–00
John C. Palfrey,	1871–73	C. E. Roberts,	1900–
Henry D. Sullivan,	1873–82		

SECRETARY AND TREASURER.

Ambrose Eastman,	1865–94	C. J. H. Woodbury,	1894–

MEMBERS OF THE ASSOCIATION.

May 1, 1906.

Members of the Association are respectfully requested to scrutinize the following list, and advise the Secretary, P. O. Box 3672, Boston, Mass., of change in address, or any error in regard to their names.

As a number of members rejoined the Association after severing their first membership, the date of their earliest election is given.

HONORARY MEMBERS.

George Arms	Grand Hotel	New York City	Oct. 16, 1872.
Henry Smith Pritchett, LL.D.,	Prest. Mass. Institute of Technology,	Boston, Mass.	Sept. 26, 1901.
Edward C. Stokes		Trenton, N. J.,	Sept. 21, 1905.
Franklin P. Stoy	817 Pacific Ave.,	Atlantic City,	Sept. 21, 1905.
Samuel Webber	Hydraulic Engineer	Charlestown, N. H.	Apr. 20, 1865.

LIFE MEMBERS.*

John Ormsbee Ames	Agt. & Sec'y Fletcher Mfg Co.,		Sept. 21, 1905.
	47 Charles St.,	Providence, R. I.,	Sept. 21, 1905.
William Ames	Treas. Fletcher Mfg. Co., P. O. Box 83,		Apr. 30, 1879.
	47 Charles St.,	Providence, R. I.,	Sept. 21, 1905.
Augustus T. Clark	Treas. American Circular Loom Co.	Chelsea, Mass.	Sept. 21, 1905. Sept. 21, 1905.
Charles H. Fish	Agt. Cocheco Manufg. Co.,	Dover, N. H.,	Apr. 27, 1887. Apr. 28, 1904.
William D. Hartshorne	Agt. Arlington Mills,	Lawrence, Mass,	Apr. 27, 1899. Apr. 26, 1906.
James R. MacColl	Treas. Lorraine Mfg. Co.	Pawtucket, R. I.,	Apr. 24, 1895. Sept. 21, 1905.
John R. Mitchell	Mitchell-Bissell Co. 38 Murray St.,	New York City	Oct. 18, 1900. Apr. 27, 1905.
Robert W. Neff	Chemical Mfr.,	22 India Sq., Boston, Mass.,	Apr. 24, 1902. Apr. 28, 1904.

* The first date is that of the original election to the Association and the second date that of Life Membership.

Walter E. Parker	Agt. Pacific Mills	217 Haverhill St., Lawrence, Mass.	Apr. 25, 1877. Apr. 27, 1905.
George I. Rockwood	Mech. Eng.	62 Summer St., Worcester, Mass.	Apr. 25, 1901. Apr. 25, 1901.
Robert Schaellibaum	Prest. Robert Schaellibaum Co.	Providence, R. I.	Sept. 22, 1904. Sept. 22, 1904.
C. J. H. Woodbury	Secretary and Treasurer, 51 Baltimore St.,	Lynn, Mass.,	Oct. 29, 1879. Apr. 28, 1904.

ACTIVE MEMBERS.

Alfred E. Adams	Agt. Whitinsville Cotton Mills Agt. Linwood Mills	Whitinsville, Mass.	Apr. 27, 1887.
Ivers S. Adams	Supt. American Net and Twine Co.	East Cambridge, Mass.	Sept. 22, 1904.
Robert Franklin Adams,	Treas. The Adams Mfg. Co. 106 Grand St.,	New York, N. Y.	Sept. 22, 1904.
William P. Adams	Supt. Pittsfield Mills,	Pittsfield, N. H.,	Apr. 28, 1904.
James W. Ahmuty	Supt. Atlantic Cotton Mills,	Lawrence, Mass.,	Apr. 28, 1904.
Joseph D. Aiken	Asst. Supt. Ponemah Mills	Taftville, Conn.	Oct. 28, 1891.
F. S. Akin	Supt. Cornell Mills	Fall River, Mass.	Sept. 27, 1894.
Charles T. Aldrich	Treas. Aldrich Mfg. Co. 37 Weybosset St., Box 34,	Providence, R. I.	Apr. 28, 1886.
Bradley C. Algeo	Asst. Director Philadelphia Textile School, Broad and Pine Sts.,	Philadelphia, Pa.,	Sept. 21, 1905.
John W. Allis	Vice-Prest. and Agt. Utica Knitting Co.,	Utica, N. Y.	Apr. 27, 1905.
George E. Ames	Mech. Supt. Lawrence Mfg. Co.	Lowell, Mass.	Apr. 24, 1895.
Charles B. Amory	Treas. Hamilton Manufg. Co. 70 Kilby St.,	Boston, Mass.	Apr. 25, 1894.
Frederic Amory	Treas. Nashua Mfg. Co. and Jackson Mfg. Co. 85 Devonshire St., P. O. Box 1302,	Boston, Mass.	Apr. 27, 1899.
Joshua D. Armitage	Supt Cloth Dept., Arlington Mills 247 Haverhill St.,	Lawrence, Mass.	Apr. 26, 1906.
Thomas Armstrong	Supt. No. Pownal Mfg. Co.	No. Pownal, Vt.	Oct. 28, 1897.
Abel T. Atherton	Machine Maker	Longmeadow, R. I.	Oct. 16, 1872.
William F. Arthur	Supt. Nashua Mfg. Co.	Nashua, N. H.	Apr. 23, 1903.
E. W. Atkinson	Stoddard, Haserick, Richards & Co. 152 Congress St.,	Boston, Mass.	Oct. 27, 1886.
H. C. Atwood	Treas. Williamsville Manufg. Co.	Killingly, Conn.	Apr. 29, 1885.
James A. Atwood	Agt. Wauregan Co. and Quinebaug Co.	Wauregan, Conn.	Oct. 28, 1891.
John Walter Atwood	Supt. Wauregan Co.	Wauregan, Conn.	Oct. 25, 1895.
W. E. Atwood	Prest. Williamsville Manufg. Co.	Killingly, Conn.	Sept. 27, 1894.
George A. Ayer	Supt. West Boylston Co.	Easthampton, Mass.	Apr. 24, 1895.
Nathaniel F. Ayer	Asst. Mgr. Farwell Bleachery, 10 P. O. Square,	Boston, Mass.	Apr. 25, 1901.

J. W. Bailey . . . . . Principal, The Bradford Durfee Textile School . . . . . Fall River, Mass. . . Apr. 23, 1903.

Dickerson G. Baker . . Mech. Eng., American Thread Co. . . . . P. O. Box B, Willimantic. Conn. . Oct. 18, 1900.

Edwin H. Baker . . . Bliss, Fabyan & Co., Box 2899 . . . . . 117 Duane St., New York, N. Y. Apr. 24, 1878.

Wallace L. Ball . . . Agt. Consolidated Cotton Duck Company, Columbia Mills Co. . . . . Columbia, S. C. . . Apr. 26, 1906.

Joseph W. Ballard . . Supt. Griswoldville Mfg. Co. . . . . Griswoldville, Mass., Apr. 26, 1906.

Edward R. Ballou . . . Treas. Ballou Yarn Co., ... 189 Charles St., Providence, R. I. . . Apr. 25, 1894.

Frederick D. Ballou . . Supt. W. A. Slater Mills . . . . . Jewett City, Conn. . Apr. 23, 1903.

V. T. Barber . . . . . Supt. Slater Cotton Co., 9 Beech St., Pawtucket, R. I. . . Oct. 2, 1902.

J. E. Barbour . . . . Prest. Barbour Flax Spinning Co. . . . . 418 Grand St., Paterson, N. J. . . . Apr. 28, 1904.

Louis B. Barker . . . Agt. United States Cotton Co. . . . Central Falls, R. I. . Apr. 27, 1899.

Harold C. Barnefield . Treas. Hays Textile Co. . . . . Pawtucket, R. I. . . Apr. 26, 1906.

Lewis E. Barnes . . . Agt. Pemberton Co. & Methuen Co., Methuen, Mass. . . . Oct. 25, 1895.

William A. Barrell . . Agt. Lawrence Duck Co. . . . . Lawrence, Mass. . . Apr. 30, 1884.

Thomas Barrett, Jr. . . Prest. Langley & Aiken Mills . . . Augusta, Ga. . . . . Apr. 26, 1900.

Edward E. Bartlett . . Asst. Supt. Hargraves Mills . . . . . P. O. Box 402, Fall River, Mass. . . Sept. 22, 1904.

Edwin N. Bartlett . . . Supt. Edwin Bartlett Co., ... North Oxford, Mass. . Apr. 29, 1891.

Daniel Moore Bates . Asst. Supt. Joseph Bancroft & Sons Co., ... Rockford, Wilmington, Del. . . Apr. 27, 1898.

William M. Batt . . . Asst. Treas. The Davol Mills Box 73, Fall River, Mass. . . Apr. 26, 1906.

Joseph P. Battles . . . Sec'y Joseph Battles Co., ... Lawrence, Mass., . . Oct. 25, 1895.

Edward C. Beach . . Gen. Mgr. Gate City Cotton Mills . East Point, Georgia . Oct. 5, 1899.

C. Enos Bean . . . . Agt. Lawrenceville Mfg. Co. . . . Lawrenceville, Ga. . Apr. 24, 1902.

George W. Bean . . . Agt. Androscoggin Mills . . . . . Lewiston, Me. . . . Apr. 17, 1872.

Robert Beatty . . . . Robert Beatty & Co. . . . . Coral and Adams Sts., Philadelphia, Pa. . . Oct. 28, 1897.

John W. Bell . . . . . Asst. Treas. and Gen. Mgr. Smith & Dove Manufg. Co. . . . . Andover Mass. . . . Oct. 28, 1897.

Albert Farwell Bemis . Prest. Jackson Fibre Co., (Jackson, Tenn.) . . . . . P. O. Box 5173, 89 State St., Boston, Mass. . . . Apr. 23. 1903.

A. C. Bent . . . . . Agt. Safety Seamless Pocket Co. . . Taunton, Mass. . . . Oct. 28, 1897.

William H. Bilbrough . Mgr. and Treas. Elmira Knitting Mills and Mgr. Conewawah . . . . . Spinning Co., Elmira, N. Y. . . . . Apr. 24, 1902.

John H. Binns . . . . Supt. Dyeing & Finishing Arlington Mills, Thornfield . . . . . Methuen, Mass. . . Apr. 26, 1906.

John B. Bird . . . . . Engineer Joseph Bancroft & Sons Co. Wilmington, Del. . Apr. 26, 1906.

Robert Bishop . . . . Robert Bishop Mfg. Co. . . . . 157 West 6th St., South Boston, Mass., Apr. 26, 1906.

W. N. Blackstone . . { Treas. Attawaugan Co. / Treas Totokett Mills Co } . . . . Norwich, Conn. . . . Apr. 29, 1896.

Wm. Washington Blades, Gen. Supt. Lorraine Mfg. Co. . . . . 135 Mineral Spring Ave., Pawtucket, R. I. . . Oct. 25, 1893.

Charles Ray Blake	Asst. Supt. Tremont and Suffolk Mills,	Lowell, Mass.,	Sept. 21, 1905.
William S. Blakeley	Prest. The Arashapa Co.	Chester, Pa.,	Sept. 21, 1905.
Edward R. Blanchard	Mgr. Glenlyon Dye Works, Phillipsdale Branch	25 Elmgrove Ave., Providence, R. I.	Apr. 26, 1906.
Robert Blood	John Blood & Co	7th and Somerset Sts., Philadelphia, Pa.	Apr. 26, 1906.
T. Ashby Blythe	Prest. Ashby Cotton Mills,	114 Chestnut St., Philadelphia, Pa.	Oct. 28, 1897.
John P. Bodge	Treas. Arkwright Mills	Fall River, Mass.	Oct. 28, 1897.
J. B. Bolton	Supt. New York Mills	New York Mills, N. Y.	Apr. 26, 1906.
Jefferson Borden, Jr.	Supt. Fall River Bleachery Co.	Fall River, Mass.	Apr. 21, 1899.
Nathaniel B. Borden	Treas. Barnard Manufg. Co.	Fall River, Mass.	Oct. 15, 1873.
Norman E. Borden	Sec. Lowell Weaving Co.	Lowell, Mass.	Apr. 26, 1906.
Raymond D. Borden	Treas. Watuppa Mills,	Taunton, Mass.	Sept. 22, 1904.
Richard B. Borden	Treas. Richard Borden Mfg. Co. Treas. Troy C. & W. Mfg. Co.	Fall River, Mass.	July 19, 1865.
E. S. Boss	Agt. American Thread Co.	Willimantic, Conn.	Oct. 29, 1879.
A. E. Bosworth	Supt. Bernon Mills	Georgiaville, R. I.	Oct. 2, 1902.
Henry Deane Bourne	Treas. Hooksett Mfg. Co.,	1741 Elm St. Manchester, N. H.	Oct. 18, 1900.
Stephen N. Bourne	Agt. Dundee Mills	971 Chestnut St., Manchester, N. H.	Oct. 21, 1868.
Frank A. Bowen	Supt. Appleton Co.	Lowell, Mass.	Apr. 28, 1897.
William V. Boyd	Asst. to Mgr. Canadian Col'd Cotton Mills Co.	P. O. Box 76, Cornwall, Ont.	Apr. 26, 1906.
Arthur F. Brackett	Supt. Royal Arctic & Valley Queen Mills,	Riverpoint, R. I.	Oct. 25, 1895.
Albert W. Brainerd		Box 33, Lawrence, Mass.	Apr. 27, 1898.
S. Parker Bremer	Treas. Monadnock Mills	4 Winthrop Sq., Boston, Mass.,	Oct. 2, 1902.
Ernest Bridge	Supt. Jas. Chadwick & Bro. Ltd.	Jersey City, N. J.	Apr. 24, 1895.
Joseph Brierley	Supt. W. C. Plunkett & Sons Warp Mill,	33 Summer St., Adams, Mass.	Sept. 21, 1905.
George T. Briggs	Prest. and Gen. Mgr. The Briggs Mfg. Co.	Voluntown, Conn.,	Apr. 24, 1902.
Jas. T. Broadbent	Instr. Carding and Spinning, Bradford Durfee Textile School,	Fall River, Mass.,	Apr. 28, 1904.
Joseph H. Bromley	Manufacturer of Lace Curtains,	Fourth and Lehigh Ave., Philadelphia, Pa.,	Sept. 21, 1905.
Christopher P. Brooks	Prin. Textile Dept., International Correspondence School,	New Bedford, Mass.	Apr. 28, 1897.
Henry R. Brown	Supt. Phenix Mill	Box 56, Phenix, R. I.	Apr. 28, 1897.
Isaac A. Brown	Treas. Narragansett Mills	Box 324, Fall River, Mass.	Sept. 29, 1898.
Thomas J. Brown	George Brown's Sons	Mt. Joy, Pa.	Oct. 28, 1897.
E. C. Bucklin	Treas. Interlaken Mills	Butler's Exchange, Box 289, Providence, R. I.	Apr. 25, 1883.
Harris H. Bucklin	Asst. Treas. Interlaken Mills	Providence, R. I.	Apr. 23, 1903.

Granville R. Budlong . Purchasing Agt. Union Wadding Co. Providence, R. I. . . Sept. 21, 1905.
E. R. Bullock, ... Mech. Eng., J. & P. Coats, Ltd., ... 38 Brook St., Pawtucket, R. I. . . Apr. 28, 1904.
Robert Burgess . . . . Treas. Slater Cotton Co. . . . . P. O. Box 697, 128 Walcott St., Pawtucket, R. I. . . Apr. 27, 1892.
Edward N. Burke . . . Lowell Machine Shop . . . . . 216 Nesmith St., Lowell, Mass. . . . Apr. 28, 1880.
Alfred H. Burnham . . Mgr. Glasgow Mills, ... Orthodox and Horrocks Sts., Frankford, . . Philadelphia, Pa. . . Apr. 26, 1900.
Charles F. Burnham . . Treas. Crefeld Waste and Batting Co., ... and The L. A. Lockwood Co. . . . Saylesville, R. I. . . Sept. 21, 1905.
Hervey Burnham . . . Supt. Beaver Mills and Eclipse Mill . . . . . 234 East Main St., North Adams, Mass. . Apr. 27, 1899.
W. R. Burnham . . . . . 362 Main St., Norwich, Conn. . . . Apr. 29, 1885.
John L. Burton . . . . Supt. Bristol Mfg. Co. . . . . New Bedford, Mass. . Apr. 23, 1903.
Samuel T. Butterworth . Supt. Baltic Mills Co., P. O. Box 103, Baltic, Conn. . . . . Sept. 21, 1905.

William H. Cadwell . . Agt. Jackson Company . . . . . Nashua, N. H. . . . Apr. 26, 1900.
John P. Campbell . . . Asst. Treas. New York Mills, New York Mills, ... Oneida Co., N. Y. . Sept. 22, 1896.
Byron F. Card . . . . Mgr. . . . . Charlotte Machine Co., Charlotte, N. C. . . . Apr. 25, 1888.
Stewart F. Carter . . . Superintending Chemist, Atlantic Fibre Co. . . . . Park Place, Suffern, N. Y. . . . Apr. 26, 1906.
Arnold B. Chace . . . Treas. Valley Falls Co. . . . . Albion, R. I. . . . . Apr. 26, 1906.
Benjamin C. Chace, Jr. . Care Jenkes Spinning Co. . . . . Pawtucket, R. I. . . Sept. 21, 1905.
Malcolm G. Chace . . Prest. Naushon Mfg. Co. . . . . Valley Falls, R. I. . . Sept. 21, 1905.
Alfred M. Chadwick, . Asst. Agt. Tremont & Suffolk Mills, Lowell, Mass. . . . Apr. 28, 1904.
John W. Chafee . . . Prest. and Treas. The Sibley Mfg. Co. Augusta, Ga. . . . . Oct. 18, 1900.
Simeon B. Chase . . . Treas. King Philip Mills . . . . . Fall River, Mass. . . Apr. 21, 1875.
E. G. Chester . . . . Prop. E. G. Chester Hosiery Co. . . . . Cedar and Huntingdon Sts., Philadelphia, Pa. . . Sept. 21, 1905.
Chas. E. Childs . . . . Treas. Hampton Co., Asst. Treas. West Boylston Co. . . . . Easthampton, Mass. . Oct. 1, 1903.
Clarence N. Childs . . Agt. Hamilton Manufg. Co. . . . . 43 Pine St., Lowell, Mass. . . . Apr. 24, 1895.
Elmer G. Childs . . . Agt. Boston Duck Co. . . . . Bondsville, Mass. . . Oct. 26, 1892.
Jno. H. C. Church . . . Treas. and Gen.Mgr.Monument Mills, Housatonic, Mass. . Apr. 28, 1897.
Avery B. Clark, ... Supt. Merrimack Mfg. Co. . . . . Lowell, Mass. . . . Apr. 27, 1905.
Ernest E. Clark . . . Supt. Williamsville Mfg. Co. . . . . Killingly, Conn. . . Apr. 29, 1896.
William Clark . . . . Agt. Wm. Clark Mills, American Thread Co. . . . . Westerly, R. I. . . Sept. 21, 1905.
E. N. Clemence . . . Cotton Manufacturer . . . . . Charlotte, N. C. . . . Apr. 28, 1897.
W. H. Cloher, Jr. . . . Prest. Utica Cotton Co., . Capron, Oneida Co., N. Y., . Sept. 22, 1896.
Alfred M. Coats . . . Gen. Mgr. J. & P. Coats, L't'd. . . . . 13 Brown St., Providence, R. I. . . Sept. 21, 1905.

W. C. Cobb	Supt. Ware Shoales Mfg. Co.	Ware Shoals, S. C.	Apr. 26, 1906.
Josiah G. Coburn	99 Washington St.,	Newton, Mass.	Apr. 20, 1865.
Charles H. Collins	Supt. Berkeley Co.	Ashton, R. I.	Apr. 26, 1900.
John A. Collins	Supt. American Linen Co. 73 Cottage St.,	Fall River, Mass.	Oct. 31, 1883.
Frank B. Comins	Treas. American Moistening Co. 79 Milk St., Room 901,	Boston, Mass.	Oct. 28, 1891.
Caesar Cone	Prest. Proximity Mfg. Co.	Greensboro, N. C.	Apr. 26, 1900.
William A. Congdon	Agt. Whitman Mills, 720 County St.,	New Bedford, Mass.	Apr. 26, 1906.
John J. Connell	Agt. Tremont & Suffolk Mills	Lowell, Mass.	Apr. 27, 1892.
Halsey Connett	Supt. Clark Mile End Spool Cotton Co.	East Newark, N. J.	Oct. 2, 1902.
Robert A. Copeland	Supt. Yarn Mills, Perry Knitting Co.,	Perry, New York	Apr. 26, 1906.
Peter H. Corr	Treas. Greenwich Bleachery	Taunton, Mass.	Apr. 24, 1895.
Frank H. Cotton		Fayetteville, N. C	Apr. 27, 1899.
Lyman M. Cousens,	Prest. Dana Warp Mills	Portland, Me.	Apr. 24, 1902.
Alphonse S. Covel	Treas. Tremont and Suffolk Mills, P. O. Box 1716, 70 Kilby St.,	Boston, Mass.	Oct. 31, 1877.
Thomas D. Covel	Director, Davis Mills	Fall River, Mass.	Apr. 26, 1906.
Richard Cowell	77 Mt. Pleasant St.,	New Bedford, Mass.	Apr. 24, 1902.
L. B. Cranska	Floyd Cranska Mills	Moosup, Conn.	Sept. 21, 1905.
William W. Crapo	Prest. Wamsutta Mills	New Bedford, Mass.	Sept. 29, 1898.
Mark B. Creed	Supt. 1, 2, 3 Wamsutta Mills	New Bedford, Mass.	Oct. 1, 1903.
George Crompton,	Treas. Wachusett Mills and member firm Crompton-Thayer Loom Co.,	Worcester, Mass.	Oct. 28, 1897.
William W. Crosby	8 Court St.,	Woburn, Mass.	Sept. 21, 1905.
John B. Cudlip	Mgr. Cornwall & York Cotton Mills Co. St. John, N. B.		Apr. 28, 1897.
H. H. Culver	Supt. Elizabeth Poole Mills 8 Coram St.,	Taunton, Mass.	Apr. 28, 1897.
Henry S. Culver	Treas. Westville Cotton Mills	Taunton, Mass.	Apr. 28, 1897.
A. G. Cumnock	Treas. Appleton Co. Box 2284,	Lowell, Mass.	July 19, 1865.
Frederick E. Cunneen	Asst. Supt. Seaconnet Mills,	Fall River, Mass.	Apr. 26, 1906.
Andrew J. Currier	Supt. Kilburn Mills	New Bedford, Mass.	Apr. 25, 1888.

Philip Dana	Supt. Dana Warp Mills	Westbrook, Me.	Sept. 29, 1898.
Woodbury K. Dana	Treas. Dana Warp Mills	Westbrook, Me.	Apr. 25, 1888.
A. Lockwood Danielson	Asst. Treas. Quinebaug Co., Box 900,	Providence, R. I.	Sept. 27, 1894.
J. DeForest Danielson	Asst. Treas. Lockwood Co. & Lewiston Bleachery & Dye Works	Providence, R. I.	Sept. 27, 1894.
John W. Danielson	Treas. Lockwood Co., Ponemah Mills, Quinebaug Co., Wauregan Co., Lewiston B. & D. Works, Box 900,	Providence, R. I.	July 15, 1868.
Bradford D. Davol	Prest. Barnard Mfg. Co., P. O. Box 93,	Fall River, Mass.	Apr. 25, 1877.
Albert Deabill	Supt. Lowell Hosiery Co.	Lowell, Mass.,	Apr. 25, 1901.
Augustus De Cort	Treas. De Cort Yarn Co., 724 Exchange Building,	Boston, Mass.	Apr. 26, 1900.

George DeForest . . . Treas. Utica Steam & Mohawk Valley Cotton Mills . . . . . Utica, New York . . Oct. 28, 1897.
George Delano . . . . Supt. Bourne Mills . . . . . Fall River, Mass. . . Apr. 26, 1906.
Henry B. Deming . . Prest. Deming Braiding Co., Box 555, Providence, R. I. . . Apr. 26, 1906.
William P. Dempsey . Treas. and Mgr. Dempsey Bleachery and Dye Works . . . . . Pawtucket, R. I. . . Apr. 28, 1886.
Charles W. Dennett . . Vice Prest. and Gen. Mgr. Hadley Mills, ... So. Hadley Falls, Mass. . Oct. 29, 1890.
Harlan Ingalls Dennett, Supt. Hadley Mills . . . . . South Hadley Falls, Mass. Apr. 27, 1905.
Arthur W. Dennis . . Prest. and Treas. Elmwood Mills . . . . . Dexter, Daboll and Maroney Sts., Providence, R. I. . . Sept. 21, 1905.
Edward P. Dennis . . . . . 50 Chelmsford St., Lowell, Mass. . . . Apr. 25, 1888.
Charles A. Denny . . . . . Leicester, Mass. . . Apr. 25, 1888.
P. Y. DeNormandie . . Treas. Pepperell Mfg. Co. . . . . 30 Kilby St., Boston, Mass. . . . Apr. 29, 1896.
Charles Owen Dexter . Agt. Beacon Mfg. Co. . . . . New Bedford, Mass., Apr. 24, 1895.
George O. Dexter . . . Supt. Canadian Colored Cotton Mills Co. Hamilton, Ont. . Apr. 27, 1905.
Henry C. Dexter, . . . Agt. and Sec. Greene & Daniels Mfg. Co. . . . . Pawtucket, R. I. . . Apr. 25, 1901.
Lewis Dexter, Jr. . . . . 65 La Casas St., Malden, Mass. . . . Apr. 27, 1899.
Albert W. Dimick . . . Agt. Fisher Mfg. Co. . . . . Fisherville, Mass. . . Apr. 25, 1894.
Bradford C. Divine . . Supt. Utica Willowvale Bleaching Co. . . . . Chadwicks, Oneida Co., N. Y. . . Apr. 27, 1899.
Charles S. Doggett . . Director, Textile Dept. Clemson College . . . . . Clemson College, S. C. Apr. 26, 1906.
Robert Dow, ... Partner in Solway Mills, ... Westerly, R. I. . . . April 25, 1901.
Arthur J. Draper . . . Prest. American Warehouse Co. . . Spray, N. C. . . . . Apr. 23, 1903.
Eben S. Draper . . . Agt. Draper Co. . . . . Hopedale, Mass. . . Oct. 31, 1888.
George A. Draper . . . Treas. Draper Co. . . . . Hopedale, Mass. . . Oct. 31, 1888.
George Otis Draper . . Sec'y Draper Co. . . . . Hopedale, Mass. . . Apr. 24, 1895.
William F. Draper . . Prest. Draper Co. . . . . Hopedale, Mass. . . July 17, 1867.
Henry C. Dresser . . . Gen. Supt. Bibb Mfg. Co. . . . . Macon, Ga. . . . . Apr. 27, 1905.
Harry K. Drew . . . Supt. Fulton Bag and Cotton Mills . Atlanta, Ga. . . . . Apr. 24, 1902.
O. D. Drew . . . . . Supt. Dwight Manufacturing Co. . . Chicopee, Mass. . . Oct. 2, 1902.
James B. Duggan . . . . . 41 Jewett Place, Utica, N. Y. . . . . Oct. 2, 1902.
Frederic C. Dumaine, . Treas. Amoskeag Mfg. Co., Box 2879 . . . . . 64 Ames Building, Boston, Mass. . . . April 25, 1901.
Joseph M. Dunham . . . . . 43 Edwards St., Springfield, Mass. . . Oct. 26, 1892.
John H. Dunn . . . . Gen. Supt. Tremont & Suffolk Mills Lowell, Mass. . . . Oct. 1, 1903.
Frank J. Dutcher . . . Asst. Agt. Draper Co. . . . . Hopedale, Mass. . . Apr. 24, 1902.
Frank H. Dwelly . . . Treas. Tecumseh Mills . . . . . Fall River, Mass. . . Apr. 27, 1899.
David H. Dyer . . . . D. H. Dyer & Son, Mill Engineers, P. O. Box 582, ... 6, 7 and 8 Pocassett Bank Building, Fall River, Mass. . . Oct. 18, 1871.

Benjamin M. Earle . . Prop. Merchants Dye Works . . . . East Dedham, Mass. Sept. 26, 1901.
Wm. Ambrose Eastman, Gen. Mgr. Hooper Knitting Co. . . Lowell, Mass. . . . Apr. 24, 1878.

Russell W. Eaton	Agt. Cabot Manufg. Co.	Brunswick, Me.	Oct. 27, 1887.
John Eccles	Agt. Ponemah Mills	Taftville, Conn.	Apr. 27, 1892.
Jesse P. Eddy, Jr.,	Asst. Treas. Tillinghast Stiles Co., and Prest. and Treas. Fitch Mfg. Co., P. O. Box 1566,	Providence, R. I.	Sept. 21, 1905.
Oscar Elsas	Vice-Prest. Fulton Bag & Cotton Mills, P. O. Box 773,	Atlanta, Ga.	Apr. 28, 1897.
Frederick W. Ely	Agt. Columbian Manufg. Co.	Greenville, N. H.	Apr. 25, 1888.
H. B. Estes	Agt. Continental Mills	Lewiston, Me.	Apr. 26, 1893.
John H. Estes	Cotton Manufacturer	Fall River, Mass.	Apr. 23, 1903.
James C. Eteson	Supt. Orswell Mills,	Fitchburg, Mass.	Sept. 22, 1904.
William Evans	Supt. Hargraves Mills, Nos. 1 & 2 267 Hanover St.,	Fall River, Mass.	Apr. 29, 1896.
D. A. Everly	371 Broadway,	Pawtucket, R. I.	Apr. 24, 1902.
Charles F. Farrar	49 Coggeshall St.,	Fall River, Mass.	Oct. 28, 1897.
George E. Farrell	Sec. Ontario Knitting Co. and Standard Yarn Mills,	Oswego, N. Y.	Oct. 18, 1900.
James T. Ferguson	Supt. Warwick Mills	Centreville, R. I.	Oct. 5, 1899.
John A. Fernley	Supt. Butler Mill	New Bedford, Mass.	Sept. 22, 1904.
Frank S. Field	Asst. Treas. Massaemit Yarn Mills	Shattuckville, Mass.	Oct. 25, 1895.
Eugene Finocchiaro	532 Broadway,	Chelsea, Mass.	Apr. 28, 1904.
William Firth	Prest. American Moistening Co. & Wm. Firth Co. 79 Milk St.,	Boston, Mass.	Apr. 25, 1888.
George Fish	Supt. Massachusetts Cotton Mills,	Lowell, Mass.	Apr. 27, 1905.
Charles W. Fisher	Asst. Supt. Fisher Mfg. Co.	Fisherville, Mass.	Apr. 25, 1901.
Henry E. Fisher	Vice-Prest.&Treas. Atlanta Cotton Mills,	Atlanta, Ga.	Oct. 25, 1895.
Frederick A. Flather	Treas. Boott Mills, 79 Milk St.,	Boston, Mass.	Apr. 29, 1891.
F. C. Fletcher	Vice Prest. Lawton Spinning Co. 621 Banigan Building,	Providence, R. I.	Oct. 18, 1900.
Benjamin Forster	Supt. Weaving, I. E. Palmer Mill 384 Main St.,	Middletown, Conn.	Apr. 26, 1906.
Henry J. Forsyth	Supt. Cooleemee Cotton Mill,	Cooleemee, N. C.	Oct. 1, 1903.
John W. Foster	Asst. Supt. Print Works, Hamilton Mfg. Co.	Lowell, Mass.	Apr. 26, 1906.
M. F. Foster		Milford, N. H.	Apr. 17, 1872.
Edward W. France	Dir. of Philadelphia Textile School, 320 So. Broad St.,	Philadelphia, Pa.	Sept. 22, 1896.
John W. France	Supt. The Aberfoyle Mfg. Co., and the Galey & Lord Mfg. Co. 427 East Broad St.,	Chester, Pa.	Sept. 21, 1905.
Arthur C. Freeman	Textile Finishing Machinery Co. 17 Exchange Place,	Providence, R. I.	Apr. 27, 1899.
Simon Friedberger	Prest. Friedberger-Aaron Mfg. Co. Germantown, Logan Station,	Philadelphia, Pa.	Apr. 23, 1903.
John W. Fries	Managing Partner, F. & H. Fries & Prest. Arista Mills Co.	Winston-Salem, N.C.,	Oct. 18, 1900.

C. H. Frisbie . . . . Agt. Attawaugan Co. . . . . Norwich, Conn. . . . Oct. 29, 1890.
Hachiro Henry Fukuhara, Supt. Sumoto Mill, Kanegafuchi Spinning Co. . . . . .
. . . . . Hiogo, Japan, . . . Apr. 28, 1904.

S. L. Gabriel . . . . . Treas. United States Linen Co. . . Taunton, Mass. . . . Sept. 22, 1904.
W. T. Galey . . . . . Prest. Aberfoyle Manufg. Co. . . . Chester, Pa. . . . . Apr. 28, 1897.
William Gammell . . . Agt. Berkeley Co. . . . . Providence, R. I. . . . Oct. 28, 1885.
Arnold C. Gardner . . Treas. Manomet Mills, 76 Bedford St., New Bedford, Mass. Apr. 26, 1906.
James G. Garland . . . Prest. The Garland Mfg. Co. . . . Saco, Me. . . . . Oct. 29, 1879.
William H. Garner . . Agt. Newmarket Mfg. Co. . . . . Newmarket, N. H. . Sept. 22, 1904.
Edward T. Garsed . . . . . Charlotte, N. C. . . Apr. 27, 1898.
Walter R. Garsed . . . Mgr. Wingohocking Cotton Mills . . . . . .
. . . . . Frankford, Philadelphia, Pa. . . Oct. 1, 1903.
E. Stanley Gary . . . Vice Prest. and Gen. Mgr. Gary Mfg. Co. . . . . .
. . . . . 724 Equitable Bldg. Baltimore, Md. . . . Oct. 1, 1903.
James A. Gary . . . . Prest. Gary Mfg. Co. . . . . .
. . . . . 720–724 Equitable Bldg., Baltimore, Md. . . . Apr. 25, 1883.
James Gee . . . . . Supt. Interlaken Dye Works . . . . Fiskville, R. I. . . . Apr. 27, 1898.
Charles E. Getchell . . Prest. Waltham Emery Wheel Co. . . . . .
. . . . . 115 Bacon St., Waltham, Mass. . . . Oct. 30, 1889.
R. H. I. Goddard Jr., . Goddard Bros. . . . . Providence, R. I. . . . Apr. 27, 1905.
William C. Godfrey . . Agt. Indian Orchard Co. . . . . Indian Orchard, Mass. Oct. 29, 1890.
Otto Goetze, ... Partner and Treas. Glasgow Mills, Orthodox and Horrocks
. . . . . Sts., Frankford, Philadelphia, Pa. . . Apr. 24, 1902.
Lyman B. Goff . . . . Prest. Union Wadding Co. . . . . Pawtucket, R. I. . . Sept. 21, 1905.
Alfred M. Goodale . . Cloth & Yarn Broker . 40 State St., Boston, Mass. . . . . Apr. 25, 1883.
Frederick B. Gordon . Prest. Columbus Mfg Co. . . . . Columbus, Ga. . . . Apr. 26, 1900.
Charles H. Gorton . . Supt. Columbus Mfg. Co. . . . . Columbus, Ga. . . . Apr. 25, 1894.
Marcellus Gould . . . Prest. and Mgr. N. H. Spinning Mills, Penacook, N. H. . . Sept. 22, 1896.
J. Whidden Graham . Supt. St. Croix Mill, Canadian Col'd Cotton Mill Co. . .
. . . . . Milltown, New Brunswick . . Apr. 26, 1906.
George P. Grant, Jr. . . Treas. Grant Yarn Co. . . . . Fitchburg, Mass. . . Sept. 27, 1894.
D. W. Gray . . . . . Manager La Tosca Spinning Co., . . Utica, N. Y. . . . . Oct. 26, 1892.
R. A. Gray . . . . . Supt. Rodman Manufg. Co. . . . . Allenton, R. I. . . . Apr. 24, 1895.
Edwin Farnham Greene, Asst. Treas. Dwight Mfg. Co. & Prest. Lockwood, Greene & Co.
. . . . . Boston, Mass. . . . Apr. 24, 1902.
Joseph Warren Greene . Sec'y Hamilton Web Co. . . . . Hamilton, R. I. . . . Apr. 29, 1896.
William C. Greene . . Treas. Peace Dale Manufg. Co. . . Peace Dale, R. I. . . Oct. 27, 1886.
John T. Greenwood . . R. Greenwood & Bault . . . . . .
. . . . . 4720 Leiper St., Frankford, Philadelphia, Pa. . . Apr. 26, 1900.
S. Greenwood . . . . Mgr. Canadian Col'd Cot. Mills Co. Ltd. . . . . .
. . . . . Cornwall, Ontario . . Oct. 5, 1899.
William K. Greer . . . Asst. Supt. Eclipse & Beaver Mills . . . . . .
. . . . . P. O. Box 258, North Adams, Mass. Apr. 26, 1906.
John Gregson . . . . Agt. Fiskdale Mills . . . . . Fiskdale, Mass. . . . Apr 24, 1895.
Maxwell Grierson . . . Gen. Mgr. Jas. Chadwick & Bro., Ltd., Jersey City, N. J. . . Apr. 27, 1898.

Adam H. Groel . . . Supt. Clark Mile End Spool Cotton Co. East Newark, N. J. . Sept. 21, 1905.
David Grove . . . . . Supt. U. S. Cotton Co. . . . . Central Falls, R. I. . Apr. 27, 1898.
George W. Grove . . . Treas. Argo Mills Co. . . . . Gloucester City, N. J. Sept. 21, 1905.
Henry S. Grove . . . Prest. Argo Mills Co., ... 318 Marine and Merchant Bldg., Philadelphia, Pa. . . Apr. 27, 1898.
Louis I. Guion . . . . Supt. Columbia Mills Co., Box 130 . Columbia, S. C. . . . Oct. 2, 1902.
Percy Gulline . . . . Supt. Merrimack Print Works, ... 315 High St., Lowell, Mass. . . . Sept. 21, 1905.
Arthur H. Gulliver . . . . . P. O. Box 313, Norwich Town, Conn. Apr. 24, 1889.
Frank B. Gustafson . . Asst. Mgr. I. E. Palmer Cotton Spinning Mill . . . . . Middletown, Conn. . Apr. 26, 1906.

William J. Hadfield . . Newburgh Steam Mills, ... 124 Smith St., Newburgh, N. Y. . . Apr. 27, 1899.
Frank J. Hale . . . . Gen. Agt. Saco and Pettee Machine Shops . . . . . Newton Upper Falls, Mass. . Apr. 27, 1892.
Walter B. Hall . . . . Supt. Hamilton Mfg. Co. . . . . Lowell, Mass. . . . . Apr. 25, 1901.
William E. Hall . . . Treas. and Mgr. Shaw Stocking Co., Lowell, Mass. . . . Apr. 27, 1892.
Z. D. Hall . . . . . Supt. Berkshire Cotton Mfg. Co. . . . . 70 Orchard St., P. O. Box 963, Adams, Mass. . . . Oct. 29, 1879.
William Halliwell . . . Mgr. Ingrahamville Dye Works . . Pawtucket, R. I. . . Sept. 21, 1905.
William Halliwell, . . Agt. Providence and Woonsocket Mills of the Lawton Spinning Co., Woonsocket, R. I. . Sept. 26, 1901.
Alton L. R. Hambly, . Supt., Quidnick Mfg. Co. . . . . Quidnick, R. I. . . Apr. 26, 1906.
John H. Hambly . . . Treas. Quidnick Manufg. Co. . . . . 49 Westminster St., Providence, R. I. . . Apr. 24, 1895.
Maylin Hamburger . . Gen. Mgr. Rockfall Mills, Rockfall, Conn. and . . . . . Montgomery Mills, ... North Wales, Pa. . . Sept. 21, 1905.
Arthur M. Hamilton . . . . . 267 Hanover St., Fall River, Mass. . . Apr. 28, 1897.
John F. Hamlet . . . Manufacturer . . . P. O. Box 160, Fall River, Mass. . . Oct. 31, 1888.
Peter Hardman . . . Supt. American Thread Co., Willimantic Mills . . . . . 137 South Main St., Willimantic, Conn. . Apr. 23, 1903.
A. G. Harris . . . . . West Warren Cotton Mills, ... West Warrren, Mass. Sept. 26, 1901.
Henry F. Harris . . . Treas. West Boylston Manufg. Co. . . . . 340 Main St., Worcester, Mass. . . Apr. 30, 1890.
Charles E. Harrison . . Mgr. Harrison Yarn & Dyeing Co. Pawtucket, R. I. . . Sept. 22, 1904.
W. G. Hartford . . . Treas. & Mgr. Monarch Woolen Mills Montville, Conn. . . Apr. 23, 1903.
Frank Hartley . . . . Supt. S. Slater & Sons, Print and Dye Works Inc. . . . . Webster, Mass, . . . Apr. 27, 1905.
Walter M. Hastings . . Asst. Agt. Arlington Mills . . . . . Lawrence, Mass. . . Apr. 23, 1903.
Chester D. Hatch . . Agt. Exeter Mfg. Co., ... Exeter N. H. . . . . Apr. 28, 1904.
William E. Hatch . . Prest. New Bedford Textile School, ... 166 William St., New Bedford, Mass. . Sept. 22, 1904.
William Hathaway . . Supt. Barnard Manufg. Co. . . . . Fall River, Mass. . . Apr. 25, 1894.
William B. Hawes . . Yarn Broker . . . 108 Bedford St., ... P. O. Box 733, Fall River, Mass. . . Apr. 24, 1895.

Alfred Hawkesworth	Supt. Merchants' Cotton Co.	Montreal, P. Q.	Apr. 26, 1893.
Fred Hawkesworth	Asst. Supt. Merchants' Cotton Co.	Montreal, P. Q.	Sept. 22, 1896.
Charles Hayes, Jr.	Supt., Skenandoa Cotton Co.	Utica, N. Y	Apr. 26, 1906.
William Hayes	Agt. Barker Mill	Auburn, Me.	Apr. 30, 1879.
William P. Heineken	Gen'l Mgr. and Sec'y Union Mf'g. and Power Co.	Union, S. C.	Apr. 26, 1906.
W. G. Henderson	Agt. Falls Co.	Norwich, Conn.	Apr. 29, 1896.
A. E. Henry,	Mfr. Partner in Solway Mills,	Westerly, R. I.	Apr. 25, 1901.
James Henry	Thos. Henry & Sons	Trenton Ave. and Tioga St., Philadelphia, Pa.	Oct. 1, 1903.
William G. Henry	Thos. Henry & Sons	Trenton Ave. and Tioga St., Philadelphia, Pa.	Oct. 1, 1903.
Arthur N. Hersom,	Supt. Fitchburg Duck Mills	Fitchburg, Mass.	Apr. 28, 1904.
Ernest L. Hersom	Supt. Nockedge Mills	40 Mechanic St., Fitchburg, Mass.	Apr. 23, 1903.
T. I. Hickman,	Prest. and Treas. Graniteville Mfg. Co.	Leonard Bldg., Augusta, Ga.	Apr. 25, 1901.
Hiram Higham	Supt. 4 and 5 Wamsutta Mills	New Bedford, Mass.	Oct. 1, 1903.
William H. Hill	Prest. Renfrew Mfg. Co.,	50 Congress St., Room 810, Boston, Mass.	Apr. 24, 1902.
George H. Hills	Treas. Davol Mills & Stevens Mfg. Co.,	Fall River, Mass.	Oct. 25, 1895.
Alexander F. Hobbs	Resident Mgr. U. S. Finishing Co	Providence, R. I.	Apr. 27, 1905.
Charles H. Hobbs	Agt. Thorndike Co.	Thorndike, Mass.	Apr. 28, 1886.
Franklin W. Hobbs	Treas. Arlington Mills	P. O. Box 5317, 78 Chauncy St.,	Boston, Mass. Apr. 27, 1899.
William Henry Hobbs	Asst. Supt. Johnson & Johnson Co.,	New Brunswick, N. J.	Apr. 24, 1902.
Clark W. Holcomb	Treas. Old Colony Mills,	Taunton, . New Bedford, Mass.	Sept. 21, 1905.
Charles M. Holmes	Agt. Manomet Mills,	Box 96, New Bedford, Mass.	Apr. 27, 1899.
Gideon F. Holmes	Treas. and Gen. Mgr. Plymouth Cordage Co.	No. Plymouth, Mass.	Oct. 30, 1889.
George W. Holt	Agt. Monohansett Manufg. Co.	Putnam, Conn.	Oct. 29, 1879.
John H. Holt	Supt. Luther Mfg. Co.	Fall River, Mass.	Apr. 23, 1903.
Walter L. Holt	Prest. Holt-Morgan Mills	Fayetteville, N. C.	Oct. 18, 1900.
William P. Holt	158 Jackson St.,	Fall River, Mass.	Oct. 25, 1893.
Robert P. Hooper	Treas. Hooper Sons Mfg. Co.,	509 Arch St., Philadelphia, Pa.	Sept. 21, 1905.
Wm. E. Hooper	Mgr. Woodberry Div. of Mt. Vernon Woodberry Co.	15 East Franklin St., Baltimore, Md.	Apr. 23, 1903.
H. B. Hopson	Supt. Spool Cotton Dept., Bibb Mfg. Co.	Box 98, Macon, Ga.	Apr. 28, 1904.
Edward W. Houghton	Supt Globe Mill,	Manville Co., Woonsocket, R. I.	Apr. 24, 1902.
Henry S. Houghton, Jr.	124 Lincoln St.,	Worcester, Mass.	Apr. 24, 1895.
W. C. Houston	Prest. Hope Mills Manufg. Co.	333 Drexel Building, Philadelphia, Pa.	Apr. 28, 1897.
Henry S. Howe	Dry Goods Commission	89 Franklin St., Boston, Mass.	Oct. 31, 1877.
Albert C. Hoy	Grosvenor Dale Co.,	P. O. Box 872, Providence, R. I.	Apr. 27, 1898.

Charles W. Hubbard . Treas. and Sec. Ludlow Mfg. Associates . . . . . 133 Essex St., Boston, Mass. . . . Apr. 25, 1901.
Otis L. Humphrey, . . Harding, Whitman, & Co., 78 Chauncy St., Boston, Mass. Apr. 25, 1901.
Arthur W. Hunking . . Engineer-in-charge, Stowe & Webster, St. Croix Falls, Wis. . Apr. 24, 1895.

D. Edwin Irving . . . Treas. The Irving & Leiper Mfg. Co., Chester, Pa. . . . . Oct. 28, 1897.

P. T. Jackson, Jr. . . . Treas. Lowell Weaving Co. . . . . Lowell, Mass. . . . Sept. 21, 1905.
Joseph B. Jamieson . . Prest. Holmes Knitting Co. . . . . 77 Summer St., Room 80, Boston, Mass. . . . Oct. 2, 1902.
Earl S. Jenckes . . . . Supt. Paul Whitin Mfg. Co. . . . . Northbridge Mass. . Apr. 27, 1905.
J. E. Jenckes . . . . . Treas. E. Jenckes Manufg. Co. & E. Jenckes Spinning Co. . . . . Pawtucket, R. I. . . Apr. 24, 1895.
Edward B. Jennings . . Treas. Samoset Co. & Agt. Allen Ptg. Co., Providence, R. I. . . . . Valley Falls, R. I. . . Sept. 29, 1898.
David L. Jewell . . . Agt. China, Webster & Pembroke Mills . Suncook, N. H. . Apr. 20, 1865.
W. H. Jillson . . . . Mfr. Cotton Yarns . . . . . Westfield, Mass. . . Apr. 26, 1906.
Leonard Johnson . . . . . 94 Highland St., Woonsocket, R. I. . Oct. 1, 1903.
David S. Johnston . . Gen. Supt. Harmony Mills . . . . Cohoes, N. Y. . . . Oct. 28, 1891.
Gordon A. Johnstone . Agt. Danielson Cotton Co. . . . . Danielson, Conn. . . Apr. 23, 1903.
W. T. Jordan . . . . Mgr. Mountain Island Mfg. Co. . . Mountain Island, N. C. Oct. 25, 1895.

Nelson D. Keables . . Mech. Supt., Mass. Cotton Mills . . Lowell, Mass. . . . Apr. 26, 1906.
W. E. Keach . . . . . Supt. Grant Yarn Co., 21 Burnap St., Fitchburg, Mass. . . Oct. 26, 1892.
Roland R. Kelly . . . Supt. Williamstown Manufg. Co. . Williamstown Sta., Mass. Nov. 30, 1881.
Nathaniel B. Kerr . . . Treas. Butler Mill . . . . . New Bedford, Mass. . Oct. 26, 1892.
Harry W. Kimball . . Supt. Riverside Cotton Mills . . . Danville, Va. . . . . Oct. 25, 1895.
William N. Kimball . . Supt. Social and Nourse Mills, Manville Co. . . . . Woonsocket, R. I. . . Apr. 24, 1902.
Robert F. Kineavy . . Supt. Jordan Mfg. Co. . . . . Chester, Pa. . . . . Sept. 21, 1905.
Alexander King, Jr. . . Asst. Supt. American Thread Co. . . Westerly, R. I. . . Apr. 27, 1905.
Emil Kipper . . . . . Prest. Blackington Mfg. Co. of Blackington . . . . . Adams, Mass. . . . Apr. 24, 1902.
John T. Kirk . . . . . Supt. Weaving Slater Cotton Co., Box 696 . . . . . Pawtucket, R. I. . . Apr. 27, 1905.
Albert F. Knight . . . Mfr. Fine White Cotton Goods and Yarns . . . . . 1149 Elmwood Ave. Box 835, Providence, R. I. . . Oct. 27, 1886
Jesse A. Knight . . . . Asst. Treas. and Supt. Argo Mills Co. Gloucester City, N. J. Oct. 26, 1892.
Stephen A. Knight . . Prest. Hebron Manufg. Co., Box 820, Providence, R. I. . . Oct. 21, 1868.
Walter B. Knight . . . Supt. Windham Mfg. Co. . . . . Willimantic, Conn. . Apr. 24, 1889.
Webster Knight . . . B. B. & R. Knight's Mills . . . . . 3 Washington Row, Providence, R. I. . . Oct. 31, 1888.
John Kniveton . . . . Instr. Weaving and Warp Preparation, ... Bradford Durfee Textile School, Fall River, Mass., . . Sept. 22, 1904.

Fred Lacey . . . . . 9 Winthrop Ave., Lawrence, Mass. . . Apr. 24, 1895.
Elliott Cowdin Lambert, Supt. Amoskeag Manufg. Co. . . . Manchester, N. H. . Oct. 25, 1895.

William T. Lang . . . Agt. Brookside Mills . . . . . Knoxville, Tenn. . . Apr. 28, 1897.
Walter H. Langshaw . Agt. Dartmouth Manufg. Corp. . . New Bedford, Mass. . Apr. 29, 1896.
Harold Lawton . . . . Treas. & Gen. Mgr. The Lawton Mills, Corp. . . . . Plainfield, Conn. . . Oct. 27, 1886.
John Edward Lawton . Governing Director American Thread Co., ... Matlock, Derbyshire, England . Apr. 25, 1901.
J. H. Ledyard . . . . Asst. Gen. Mgr. Meridian Cotton Mills, Meridian, Miss. . . . Sept. 22, 1904.
Calvin H. Lee . . . . Supt. Readville Cotton Mills . . . Hyde Park, Mass. . . Apr. 24, 1902.
Evan Arthur Leigh . . Textile Machinery 232 Summer St., Boston, Mass. . . . . Oct. 29, 1890.
J. Colby Lewis . . . . Agt. Salmon Falls Mfg. Co. . . . . Salmon Falls, N. H. . Oct. 26, 1892.
Charles F. Libby . . . Supt. Shaw Stocking Co. . . . . Lowell, Mass. . . . Apr. 24, 1902.
Leontine Lincoln . . . Prest. Seaconnet Mills . . . . . Fall River, Mass. . . Apr. 28, 1897.
B. F. G. Linnell . . . Commission Merchant, Yarns, Threads and Twines . . . . . 37 Summit St., P. O. Box 645, Central Falls, R. I. . . Oct. 28, 1897.
Henry F. Lippitt . . . Gen. Mgr. Manville Cos., P. O. Box 139, Providence, R. I. . . Apr. 27, 1881.
L. A. Lockwood . . . { Prest. Crefeld Waste & Batting. / Co. & The L. A. Lockwood Co. } Saylesville, R. I. . . Sept. 21, 1905.
William H. Loftus . . Supt. Clark Thread Co. . . . . Newark, N. J. . . . Oct. 28, 1897.
Harry D. Lord . . . . Selling Agt. Saco and Pettee Machine Shops . . . . . 244 Main St., Biddeford, Me. . . . Apr. 27, 1905.
Hartley L. Lord . . . Gen. Mgr. Union-Buffalo Mills Co, . Union, S. C. . . . . Apr. 26, 1906.
John T. Lord, ... Supt. Pacific Mills, ... Lawrence, Mass. . . Apr. 28, 1904.
Robert W. Lord . . . Treas. & Agt. R. W. Lord & Co. . . Kennebunk, Me. . . Oct. 20, 1869.
Ernest Lovering . . . Agt. Lyman Mills . . . . . Holyoke, Mass. . . . Apr. 25, 1888.
Henry M. Lovering . . Agt. Whittenton Manufg. Co. . . . Taunton, Mass. . . . Oct. 27, 1880.
William C. Lovering . Prest. Whittenton Manufg. Co. . . . . 50 State St., Boston, Mass. . . . Oct. 25, 1876.
William M. Lovering . Lawrence & Co., ... 24 Thomas St. New York, N. Y. . . Sept. 27, 1894.
Arthur H. Lowe . . . Treas. Parkhill Mfg. Co., Treas. Wm. Lowe Mfg. Co., ... Huntsville, Ala. . . . . Fitchburg, Mass. . . Oct. 30, 1889.
David Lowe . . . . . Supt. Parkhill Manufg. Co. . . . . Fitchburg, Mass. . . Apr. 24, 1895.
Charles B. Luther . . . Treas. Luther Mfg. Co. . . . . 240 Hartwell St., Fall River, Mass. . . Sept. 22, 1904.
Dudley T. Lyall . . . . . Delhi, Delaware, County N. Y. Sept. 22, 1896.
William L. Lyall . . . Treas. Brighton Mills . . . . . Passaic, N. J. . . . . Oct. 26, 1892.
Herbert Lyman . . . . . 39 Beacon St., P. O. Box 1717, Boston, Mass. . . . Oct. 25, 1895.
Ronald T. Lyman . . . Treas. Boston Mfg. Co. . . . . P. O. Box 1717, Boston, Mass. . . . Oct. 1, 1903.
Alvin S. Lyon . . . . Agt. Wood Worsted Mill . . . . . Lawrence, Mass. . . Apr. 26, 1882.

W. H. Macdonald . . Asst. Supt., St. Croix Mill, Canadian Col'd Cotton Mill Co., ... Milltown, New Brunswick . . Apr. 26, 1906.
Charles L. Macomber . Prest. Winthrop Cotton Yarn Co. . Taunton, Mass. . . . Apr. 24, 1895.
Frederick B. Macy, . . Treas. Soule Mills, ... New Bedford, Mass. . Apr. 25, 1901.
Amos G. Maddox . . . Supt. Linwood Mill . . . . . Linwood, Mass. . . . Oct. 18, 1900.

Charles T. Main	Mech. and Mill Engineer, Dean & Main		
	53 State St., 1112 Exchange Bldg.,	Boston, Mass.	Oct. 28, 1885.
Alexander Makepeace	Supt. Richard Borden Mfg. Co.	Fall River, Mass.	Oct. 1, 1903.
Charles R. Makepeace	Mill Engineer	Box 973, Providence, R. I.	Apr. 30, 1890.
Vladimir Malinin, M. E.,	Prochoroff Three Hill Mfg. Co.	Moscow, Russia	Apr. 23, 1903.
J. D. Mallory	Supt. John M. Stone Cotton Mill	Starkville, Miss.	Apr. 27, 1905.
Fred B. Manley	Treas. Spencer Yarn Co.	Adamsdale, Mass.	Apr. 26, 1906.
Arthur B. Mann	J. H. Martin & Co., 99 Franklin St.,	New York, N. Y.	Apr. 25, 1894.
Charles H. Manning	Supt. Amoskeag Manufg. Co.	Manchester, N. H.	Oct. 28, 1885.
Henry F. Mansfield	Gen. Supt. Utica Steam Cotton Mills and Mohawk Valley Cotton Mills	Utica, N. Y.	Apr. 30, 1890.
Paul J. Marrs	Treas. Henderson Cotton Mills	Henderson, Ky.	Oct. 28, 1897.
Henry D. Martin	Supt. Parker Mills No. 2	Warren, R. I.	Apr. 28, 1897.
Arthur H. Mason	Treas. Davis Mills	Fall River, Mass.	Oct. 2, 1902.
Frederick R. Mason	Prest. and Treas. The Robert D. Mason Co.	Pawtucket, R. I.	Sept. 21, 1905.
Philip A. Mathewson	Supt. King Philip Mills	Box 607, Fall River, Mass.	Apr. 24, 1895.
Scott Maxwell,	Agt. Indian Head Mills of Ala.	Cordova, Ala.	Sept. 26, 1901.
Thomas Mayor	Textile Machinery		
	Thomas Mayor & Son, 26 Olney St.,	Providence, R. I.	Oct. 27, 1880.
Andrew W. McAllister		Natick, R. I.	Apr. 28, 1904.
Robert McArthur	Agt. Pepperell Mfg. Co.	Biddeford, Me.	Apr. 17, 1872.
Thos. McAulifie	Supt. Stevens Mfg. Co.	Fall River, Mass.	Apr. 27, 1898.
Edward J. McCaughey	Sec'y Home Bleach & Dye Works	Pawtucket, R. I.	Apr. 26, 1906.
Albert E. McDonald	Agt. Lawrenceville Mfg. Co.,	Lawrenceville, Ga.	Oct. 2, 1902.
Fred C. McDuffie	Treas. Everett Mills and York Mfg. Co., P. O. Box 2934	24 Milk St., Boston, Mass.	Oct. 25, 1882.
Robert P. McEwen	Supt. Lambeth Rope Corp.		
	64 Willis St.,	New Bedford, Mass.	Apr. 26, 1906.
John G. McFadden	Supt. Natick Mills	Natick, R. I.	Oct. 1, 1903.
David H. McKinley	Prop. Philadelphia Thread Co.		
	Hancock and Oxford Sts.,	Philadelphia, Pa.	Sept. 21, 1905.
James A. McLane	Supt. Davis Mills	Fall River, Mass.	Oct. 2, 1902.
William G. McLoon	Supt. Lancaster Mills,	Clinton, Mass.	Apr. 27, 1892.
Robert G. McMeehan,	Supt. Uncasville Mfg. Co.	Uncasville, Conn.	Sept. 26, 1901.
William P. McMullan	Agt. Naumkeag Steam Cotton Co.	Salem, Mass.	Sept. 27, 1894.
John Tempest Meats	Agt. Mason Machine Works	Taunton, Mass.	Apr. 27, 1887.
Robert B. Meikle	Supt. Lorraine Mfg. Co.	Westerly, R. I.	Apr. 23, 1903.
Henry P. Meikleham,	Agt. Mass. Mills in Georgia	Lindale, Floyd Co., Ga.	Apr. 26, 1900.
Joseph Mercer	Agt. and Treas. Willimantic Cotton Mills Co.	Willimantic, Conn.	Apr. 24, 1902.
Charles H. Merriman, Jr.	Manville Co., Board of Trade Bldg.,	Providence, R. I.	Apr. 24, 1895.
James G. Merriam, Jr.	Mgr. Standard Spinning Co.	Oswego, N. Y.	Sept. 21, 1905.
Joseph Merriam	Prest. Springfield Webbing Co.	Middletown, Conn.	Oct. 2, 1902.
R. M. Miller, Jr.	Prest. & Treas. Elizabeth Mills	Charlotte, N. C.	Sept. 29, 1898.
Simon Miller	Member Firm Jacob Miller Sons & Co., Borich Mills		
	16th & Reed Sts.,	Philadelphia, Pa.	Apr. 26, 1906.

Almon A. Milliken	Supt. The Jackson Co.	Nashua, N. H.	Sept. 21, 1905.
James I. Milliken	Agt. Everett Mills	Lawrence, Mass.	Oct. 26, 1892.
Roscoe S. Milliken	Agt. Nashua Mfg. Co.	Nashua, N. H.	Apr. 29, 1896.
David Milne	C. J. Milne & Sons Washington Ave. & 10th and 11th Sts.,	Philadelphia, Pa.	Apr. 28, 1897.
A. B. Mole	Gen. Mgr. Dominion Cotton Mills Co. 210 Milton St.,	Montreal, P. Q.	Apr. 24, 1895.
Edward A. Mongeon	Supt. Lonsdale Mills	Lonsdale, R. I.	Apr. 24, 1895.
George M. Montgomery	Vice Prest. The J. R. Montgomery Co.	Windsor Locks, Conn.	Sept. 22, 1904.
J. R. Montgomery	Prest. The J. R. Montgomery Co.	Windsor Locks, Conn.	Sept. 29, 1898.
George A. Moody	Supt. West Warren Cotton Mills	West Warren, Mass.	Apr. 27, 1899.
Fred W. Moore	Agt. Cordis Mills P. O. Box 582,	Millbury, Mass.	Apr. 27, 1892.
William F. Morgan	Treas. & Gen. Mgr. Fitchburg Duck Mills	Fitchburg, Mass.	Apr. 26, 1906.
George B. Morison	Prest. Ballou Yarn Co., 77 Summer St.,	Boston, Mass.	Apr. 24, 1895.
Albert H. Morton	Supt. Lowell Machine Shop	Lowell, Mass.	Oct. 28, 1891.
E. P. Morton,	Agt. Stevens Linen Works	Webster, Mass.	Sept. 26, 1901.
Oliver H. Moulton		Lowell, Mass.	Apr. 20, 1865.
Harold Mowry	Mgr. Sterling Branch U. S. Finishing Co.	Sterling, Conn.	Apr. 27, 1905.
Farquharson J. Muir	Cone Export & Commission Co.	Greensboro, N. C.	Apr. 27, 1892.
William Myers	Lecturer in Textiles, Sunny Bank, Stone Edge, Marple, Cheshire,	England	Sept. 22, 1904.
John Neild	Agt. Grinnell Mfg. Corp.	New Bedford, Mass.	Apr. 25, 1901.
Will Nelson	Head Instructor of Weaving, Lowell Textile School	Lowell, Mass.	Apr. 23, 1903.
Roscius C. Newell	Supt. Palmer Mill, Otis Co.	Three Rivers, Mass.	Oct. 25, 1895.
H. W. Nichols	Supt. New Bedford Textile School	New Bedford, Mass.	Sept. 22, 1904.
William A. Nichols	Mill Supt. 120 Pine St.,	Fall River, Mass.	Apr. 26, 1906.
William G. Nichols	Sec. and Treas. Springstein Mills and Pres. Wylie Mills	Chester, S. C.	Oct. 25, 1893.
Albert W. Noone,	Prop. & Mgr. Jos. Noone's Son's Co.	Peterboro, N. H.	Sept. 26, 1901.
Franklin Nourse	Agt. Lawrence Manufg. Co.	Lowell, Mass.	Apr. 24, 1878.
S. Odenheimer	Prest. Lane Mills	New Orleans, La.	Oct. 25, 1893.
Charles K. Oliver	Prest. U. S. Duck Corporation	Baltimore, Md.	Sept. 27, 1894.
Louis Atwell Olney	Prof. Chemistry & Dyeing, Lowell Textile School	Lowell, Mass.	Apr. 26, 1906.
William B. Orr,	Treas. Forestdale Mfg. Co.	Forestdale, R. I.	Apr. 28, 1904.
Henry Osgood,	6 Monroe St., P. O. Box 204,	Salem, Mass.	Apr. 25, 1901.
Frederick Ott	Supt. Lehigh Valley Silk Mills	South Bethlehem, Pa.	Apr. 23, 1903.
Herbert W. Owen	Supt. Cocheco Mfg. Co.	Dover, N. H.	Oct. 5, 1899.
Logan Owen	Supt. Mill No. 1, Bibb Mfg. Co.,	Macon, Ga.	Apr. 28, 1904.
Oscar L. Owen	Mech. and Mill Eng. Whitin Machine Works P. O. Box 168,	Whitinsville, Mass.	Apr. 25, 1894.

Elmer E. Page . . . . Agt. York Manufacturing. Co. . . . Saco, Me. . . . . Apr. 27, 1892.
Calvin D. Paige . . . Treas. Central Mills . . . . . Southbridge, Mass. . Apr. 26, 1906.
Walter H. Paige . . . Supt. Wamsutta Mills Nos. 6 & 7 . . New Bedford, Mass. . Oct. 1, 1903.
O. B. Parker . . . . . Supt. Quidnick Mfg. Co. . . . . Quidnick, R. I. . . . Apr. 24, 1895.
Samuel L. Parker . . . Supt. Turners Falls Cotton Mills . . . . . Box 627, Turners Falls, Mass. . Apr. 29, 1896.
Samuel F. Patterson . . Prest. and Treas. Thistle Mills Co. . Ilchester, Md. . . . Oct. 18, 1900.
Arthur H. Paul . . . . Asst. Supt. Boston Mfg. Co. . . . . Waltham, Mass. . . . Apr. 27, 1905.
John W. Pead . . . . . 1072 Bridge St., Lowell, Mass. . . . . Apr. 26, 1893.
James R. Pearce . . . Supt. Pell City Mfg. Co. . . . . Pell City, Ala. . . . Oct. 25, 1895.
William E. Peck . . . Agt. The Baltic Mills Co. . . . . Baltic, Conn. . . . . Apr. 26, 1906.
H. M. Peirce . . . . . Agt. Greenwich Bleachery . . . . East Greenwich, R. I. Apr. 26, 1906.
William C. Peirce . . . Pres. Elizabeth Mills . 564 Eddy St., Providence, R. I. . . . Apr. 24, 1895.
William D. Pennell . . Agt. Hill Manufg. Co. . . . . Lewiston, Me. . . . Apr. 16, 1873.
Haven C. Perham . . . Treas. Kitson Machine Co. . . . . Lowell, Mass. . . . Apr. 30, 1879.
Charles W. Perkins . . Supt. Totokett Mfg. Co. . . . . Versailles, Conn. . . Sept. 21, 1905.
Hadley D. Perkins . . Mgr. Bellingham H'dk'f Mfg. Co., R. F. D. No. 1 . . . . . Woonsocket, R. I. . Apr. 28, 1904.
Aaron C. Phelps . . . Vice Prest. & Gen. Mgr. German-American Co. . . . . Spray, N. C. . . . . Apr. 26, 1906.
Henry C. Phillips . . . Asst. Gen. Supt. Harmony Mills . . Cohoes, N. Y. . . . Apr. 25, 1894.
Benjamin C. Phipps . . Merchant . . . . 4 Winthrop Sq., Boston, Mass. . . . Sept. 29, 1898.
Albert R. Pierce . . . Supt. Pierce Mfg. Corp. . . . . New Bedford, Mass. . Oct. 5, 1899.
Andrew G. Pierce, Jr. . Treas. Pierce Manufg. Corp. . . . . P. O. Box 34, New Bedford, Mass. . Apr. 24, 1895.
Robert Place . . . . . Supt. Flint Mills, Fall River, Mass., Corr Mills, Taunton, Mass., ... 212 Weybosset St., Fall River, Mass. . . Apr. 26, 1906.
Charles H. Plummer . . Agt. Great Falls Manufg. Co., . . . Somersworth, N. H. Apr. 25, 1888.
Charles T. Plunkett . . Sec. Berkshire Cotton Mfg. Co. . . Adams, Mass. . . . Apr. 28, 1897.
William B. Plunkett . . Treas. Berkshire Cotton Mfg. Co. and Greylock Mills . . . . . Adams, Mass. . . . Sept. 21, 1905.
William C. Plunkett . . Mgr. W. C. Plunkett & Sons . . . Adams, Mass. . . . Oct. 1, 1903.
Frank Porter, Jr. . . . Supt. Danielson Cotton Mill . . . . Danielson, Conn. . . Apr. 26, 1906.
Charles H. Potter, . . . Supt. Montreal Cotton Co., ... Valleyfield, P. Q., . . Apr. 25, 1901.
Joseph H. Potter, Jr. . Supt. Durfee Mills . . . . . Fall River, Mass. . . Apr. 27, 1899.
J. F. Powers . . . . . Supt. Spinning Mill . . . . . Middletown, Conn. . Oct. 5, 1899.
Lavater W. Powers . . Gen. Supt. New York Mills . . . . . New York Mills, Oneida County, N. Y. Oct. 1, 1903.
Albert S. Pratt . . . . Agt. Edwards Mfg. Co. . . . . Augusta, Me. . . . . Apr. 27, 1905.
Herbert L. Pratt . . . Agt. Bates Manufg. Co. . . . . Lewiston, Me. . . . Oct. 27, 1875.
George E. Prest . . . 9 Russell St. . . . . Melrose, Mass. . . . Apr. 24, 1902.
John E. Prest . . . . 9 Russell St. . . . . Melrose, Mass. . . . Apr. 17, 1872.

F. J. Quinn . . . . . Agt. Fiskdale Mills . . . . . Fiskdale, Mass. . . . Apr. 26, 1906
M. W. Quinn . . . . . Agt. Hamilton Woolen Co. . . . . Amesbury, Mass. . . Oct. 27, 1886.

John W. Ramsbottom . Supt. . . . . Pawtucket, R. I. . . Apr. 24, 1902.

Theodore Ellis Ramsdell, Gen. Supt. Monument Mills . . . . Housatonic, Mass. . Apr. 23, 1903.
M. A. Rawlinson . . . Agt. Chicopee Mfg Co. . . . . Chicopee Falls., Mass. Apr. 24, 1895.
Charles O. Read . . . Mgr. Sayles' Bleacheries, and Treas. Glenlyon Dye Works
. . . . . 63 Summit St. Pawtucket, R. I. . . Sept. 21, 1905.
John F. Reardon . . . Supt. Millville Mfg. Co. . . . . Millville, N. J. . . . Apr. 26, 1900.
Robert Redford . . . . . Box 28, Lawrence, Mass. . . Apr. 26, 1882.
R. S. Reinhardt . . . . Treas. and Mgr. Elm Grove Cotton Mills . . . . . .
. . . . . Lincolnton, N. C. . . Apr. 27, 1898.
T. H. Rennie . . . . . Supt. Graniteville Mfg. Co. . . . . Graniteville, S. C. . . Oct. 18, 1900.
William H. Rennie . . Supt. Warren Mfg. Co. . . . . Warrenville, S. C. . . Apr. 26, 1906.
Robert Reoch . . . . Gen. Mgr. Cranston Print Works Co. Phenix, R. I. . . . . Sept. 21, 1905.
Frederick W. Reynolds, Supt. Potomska Mills, ... Box 299, ...
. . . . . 20 Fifth St., New Bedford, Mass. . Apr. 26, 1900.
Francis H. Rice . . . . Prest. Holbrook Mills . . . . . Millbury, Mass. . . . Apr. 28, 1880.
John Bion Richards . . Treas. Davis Mills . . . . . Fall River, Mass. . . Apr. 24, 1902.
Charles H. Richardson Agt. Lancaster Mills . . . . . Clinton, Mass. . . . Apr. 24, 1889.
Harry J. Ricketson, . . Supt. Merchants' Mfg. Co. . . . . Fall River, Mass., . Apr. 28, 1904.
Walter Rigby . . . . Bibb Mfg. Co. . . 3163 First Ave., Columbus, Ga. . . . Apr. 26, 1900.
Charles E. Riley . . . C. E. Riley & Co. . . . . .
. . . . . 65 Franklin St., Box 2815, Boston, Mass. . . . Apr. 25, 1888.
Benj. H. Roberts . . . General Mill Supplies 163 Grove St., Fall River, Mass. . . Apr. 26, 1900.
George W. Robertson . Supt. Dan River Cotton Mills . . . Danville, Va. . . . . Apr. 26, 1906.
Charles D. Robinson . Supt. Crompton Co. . . . . Crompton, R. I. . . . Sept. 27, 1894.
William H. Robinson . Supt. No. 3 Harmony Mill . . . . Cohoes, N. Y. . . . Apr. 24, 1902.
John J. Rooney . . . Asst. Supt. Tremont & Suffolk Mills . . . . . .
. . . . . 151 Cabot St., Lowell, Mass. . . . Apr. 27, 1905.
W. H. Rose . . . . . Sec'y & Treas. Richland, Granby and Olympia Cotton Mills
. . . . . Columbia, S. C. . . . Oct. 18, 1900.
Israel P. Rounds . . . Supt. Naushon Co., 20 Maynard St., Pawtucket, R. I. . . Apr. 26, 1906.
Henry Rowe . . . . Supt. Elk Mountain Bleachery . . . Asheville, N. C. . . Apr. 28, 1904.
Lewis H. Russell . . . . . Norfolk St. and Sussex Ave., Newark, N. J. . . . Apr. 27, 1905.

Alfred Sagar . . . . . Supt. Arlington Cotton Mills . . . . . .
. . . . . 6 Stevens St., Methuen, Mass. . . Apr. 24, 1902.
Edward H. Sanborn . . Vice Prest. Cold Spring Bleaching and Finishing Works .
. . . . . 305 Betz Bldg., Philadelphia, Pa. . . Oct. 18, 1900.
J. N. Sanderson . . Agt. Renfrew Mfg. Co., ... Adams, Mass., . . . Apr. 28, 1904.
Arnold B. Sanford . . Prest. Kennebec Spinning Mills . . . . . .
. . . . . 67 Chauncy St., Boston, Mass. . . . Oct. 25, 1882.
Pardon B. Sanford . . Supt. Yarn Dept. Utica Knitting Co., Utica, N. Y. . . . Oct. 2, 1902.
J. Herbert Sawyer . . . . . 84 State St., Boston, Mass. . . . July 19, 1865.
Frank A. Sayles . . . Prop. Sayles Bleacheries, Prest. Lorraine Mfg. Co. . . .
. . . . . Pawtucket, R. I. . . Apr. 26, 1906.
Arnold Schaer . . . . Agt. Warren Manufg. Co. . . . . Warren, R. I. . . . Apr. 24, 1895.
Albert E. Schofield . . Delph Spinning Co. . . . . .
. . . . . Clearfield and C Sts., Philadelphia, Pa. . . Oct. 1, 1903.

Theodore C. Search	Prest. Cold Spring Bleaching and Finishing Works	Yardley, Pa.	Oct. 18, 1900.
Albion K. Searls	Supt. Yarn Dept., Oneita Knitting Mills	195 Elizabeth St., Utica, N. Y.	Apr. 24, 1902.
Charles M. Sears	Supt. Harmony Grove Cotton Mills,	Commerce, Ga.	Apr. 27, 1898.
George H. Shapley	Treas. Silver Lake Co., 78 Chauncy St.	Boston, Mass.	Apr. 29, 1896.
Frank P. Sheldon	Mill Engineer and Architect, 49 Westminster St.	Industrial Trust Bldg. Providence, R. I.	Apr. 25, 1894.
Thomas C. Sheldon		8 School St., Fitchburg, Mass.	Oct. 29, 1884.
Charles W. Shepard	Mgr. Rhode Island Lace Works	Drownville, R. I.	Sept. 21, 1905.
Willis S. Shepard	Prest. American Net and Twine Co.	Ponkapoag, Mass.	Apr. 29, 1896.
William F. Sherman	Mill Engineer	294 Washington St., Boston, Mass.	Apr. 15, 1874.
Charles M. Shove	Treas. Granite Mills	Box 45, Fall River, Mass.	Oct. 27, 1875.
W. Frank Shove	Treas. Pocasset Mfg. Co., Fall River Mfg Co., Fall River, Mass. and Windham Mfg. Co., Willimantic, Conn.	Fall River, Mass.	Sept. 22, 1904.
Herbert H. Shumway		Taunton, Mass.	Apr. 26, 1893.
Francis H. Silsbee	Supt. Cotton Dept. Pacific Mills	Lawrence, Mass.	Apr. 7, 1887.
Nathaniel G. Simonds	Treas. Naumkeag Steam Cotton Co.,	Salem, Mass.	Apr. 27, 1898.
Louis Simpson	Gen. Mgr. Montreal Cotton Co.	Valleyfield, P. Q.	Apr. 24, 1895.
John Skinner	Asst. Treas. West Boylston Mfg. Co.,	Easthampton, Mass.	Apr. 26, 1906.
Abbott E. Slade	Treas. Laurel Lake Mills	863 High St., Fall River, Mass.	Oct. 25, 1893.
Archer J. Smith	Treas. The American Mills Co.	Waterbury, Conn.	Apr. 26, 1906.
Arthur T. Smith	Supt. Langley Manufg Co. Supt. Aiken Manufg. Co.	Langley, S. C.	Oct. 25, 1895.
Charles S. Smith	Mgr. Smith Webbing Co.	Pawtucket, R. I.	Sept. 21, 1905.
James Herbert Smith	Supt. Quinebaug Co.	Danielson, Conn.	Apr. 27, 1898.
Joel Smith	1311 Woodlawn Ave.	Augusta, Ga.	Oct. 25, 1895.
J. C. Smith	Supt. Chace Mills	Fall River, Mass.	Oct. 28, 1897.
John William Smith	Gen. Mgr. T. I. Birken & Co.	Chester, Pa.	Sept. 21, 1905.
Stephen E. Smith	Instr. Cotton Spinning, Lowell Textile School,	Lowell, Mass.	Apr. 27, 1905.
Thomas Henry Smith	Jamestown Cotton Mill	Jamestown, N. Y.	Apr. 30, 1884.
W. H. Smith	Supt. American Textile Co.	Pawtucket, R. I.	Sept. 21, 1905.
Rufus A. Soule	Prest. Soule Mill & City Mfg. Cor.	New Bedford, Mass.	Apr. 28, 1904.
Rufus A. Soule Jr.	Treas. Taber Mill	New Bedford, Mass.	Apr. 26, 1906.
William S. Southworth	Agt. Mass. Cotton Mills	Box 1230, Lowell, Mass.	Oct. 31, 1888.
Antonio Spencer	Prest. Spencer Yarn Co.	441 Butler Exchange, Providence, R. I.	Sept. 21, 1905.
Wilton H. Spencer	Textile Manuf.,	7 Exchange Pl., Providence, R. I.	Apr. 27, 1898.
George E. Spofford	Supt. Blackstone Mfg. Co.	Blackstone, Mass.	Apr. 29, 1896.
Alban Spooner	Prest. Beverly Underwear Co.	Beverly, N. J.	Sept. 21, 1905.
Henry B. Sprague	Treas. Boston Woven Hose and Rubber Co.	Lynn, Mass.	Oct. 5, 1899.
Leroy Springs	Prest. Lancaster Cotton Mills	Lancaster, S. C.	Oct. 25, 1895.

George R. Stearns . . Prest. and Treas. Riverside Mills . Augusta, Ga. . . . . Apr. 30, 1890.
T. B. Stevenson . . . . Supt. Manchaug Co. . . . . Manchaug, Mass. . . Apr. 26, 1900.
Robert Stewart . . . . Asst. Supt. Lonsdale Co. . . . . Ashton, R. I. . . . . Apr. 27, 1899.
Samuel Stewart . . . . Supt. Boston Duck Co. . . . . Bondsville, Mass. . . Apr. 23, 1903.
William J. Stewart . . Supt. S. Slater & Sons, Inc. . . . . Webster, Mass. . . . Apr. 23, 1903.
Walter F. Stiles . . . Treas. Orswell Mills . . . . . Fitchburg, Mass. . . Oct. 25, 1895.
O. W. Stites . . . . . Supt. Louisville Cot. Mills Co. . . . Louisville, Ky. . . . Oct. 25, 1895.
B. L. Stowe . . . . . Vice-Prest. Eureka Fire Hose Co. . . . . Wilkinson and Arlington Aves., Jersey City, N. J. . . Sept. 26, 1901.
Herman F. Straw . . . Agt. Amoskeag Manufg. Co. & Manchester Mills. . . . . Manchester, N. H. . . Oct. 28, 1885.
John Sullivan . . . . Care C. E. Riley, & Co., ... 65 Franklin St. Boston, Mass. . . . Apr. 27, 1899.
Timothy Sullivan . . . Supt. Stafford Mills . . . . . Fall River, Mass. . . Apr. 27, 1899.
Walter H. Summersby . Agt. Atlantic Cotton Mills . . . . Lawrence, Mass. . . Oct. 25, 1893.
James O. Sweet . . . . Agt. and Treas. Ashland Cotton Co. Jewett City, Conn. . Apr. 28, 1886.

Frederic Taber . . . . Prest. Taber Mill . . . . . New Bedford, Mass. Apr. 26, 1906.
William C. Taber . . . Treas. Whitman Mills and Prest. Beacon Mfg. Co. . . . . New Bedford, Mass. Sept. 21, 1905.
Charles A. Tabor . . . Supt. Thorndike Co. . . . . Thorndike, Mass. . . Apr. 27, 1905.
Robert W. Taft . . . . Treas. Coventry Co. and Bernon Mills . . . . . Box 1144, Providence, R. I. . . Sept. 27, 1894.
George P. Taylor . . . . . 286 Chestnut St., Clinton, Mass. . . . Oct. 27, 1880.
James W. Taylor . . . Supt. Wampum Mills . . . . . Lincolton, N. C. . . Oct. 26, 1892
Samuel Taylor . . . . Supt. Soule Mill . . . . . New Bedford, Mass. . Oct. 1, 1903.
W. Marshall Taylor . . Agt. Indian Orchard Flax Co. . . . . North Brookfield, Mass. . . Sept. 22, 1896.
Richard Thackeray . . Supt. Weetamoe Mills . . . . . Fall River, Mass. . . Apr. 29, 1885.
Edward Thayer . . . . Sec'y Lebanon Mill Co. . . . . Pawtucket, R. I. . . Sept. 21, 1905.
S. Willard Thayer . . . Treas. Dexter Yarn Co. . . . . Pawtucket, R. I. . . Sept. 26, 1901.
Berton A. Thissell . . Supt. Boott Cotton Mills . . . . . 47 Mt. Vernon St., Lowell, Mass. . . . Oct. 1, 1903.
Earl A. Thissell . . . . Treas. Lowell Hosiery Co. . . . . Lowell, Mass. . . . Oct. 30, 1878.
Ariel C. Thomas . . . Agt. Boott Cotton Mills . . . . . 62 Mt. Vernon St., Lowell, Mass. . . . Oct. 31, 1888.
Charles E. Thomas . . . . . 44 Prospect St., Woonsocket, R. I. . . Oct. 31, 1883.
Edward W. Thomas . . Gen. Mgr. Consolidated Cotton Duck Co. . . . . 809 Continental Trust Bldg., Baltimore, Md. . . . Apr. 30, 1884.
D. M. Thompson . . . . . 38 Mawney St., P. O. Box 442, Providence, R. I. . . Oct. 28, 1885.
James O. Thompson, Jr. Supt. Wampanoag Mills . . . . . Fall River, Mass. . . Oct. 18, 1900.
Charles R. Thomson . Asst. Gen. Supt. Renfrew Co. . . . Adams, Mass. . . . Apr. 27, 1905.
Ralph E. Thomson . . Supt. Parkhill Manufg. Co., Mill C. Fitchburg, Mass. . . Apr. 25, 1894.
T. W. Tillar . . . . . Treas. The Ashby Cotton Mill Co., Inc. Emporia, Va. . . . Sept. 21, 1905.
R. Irving Tobey . . . . . Lonsdale, R. I. . . . Oct. 2, 1902.

W. O. Todd . . . . . Sec. and Treas. Lawton Spinning Co. Box 1125, ...
. . . . . 621 Banigan Building, Providence, R. I. . . Oct. 18, 1900.
James P. Tolman . . . Prest. Samson Cordage Works . . . . . .
. . . . . 88 Broad St., Boston, Mass. . . . Oct. 29, 1890.
Daniel A. Tompkins . Prest. and Eng. D. A. Tompkins Co. Charlotte, N. C. . . . Oct. 25, 1895.
M. J. Toohey . . . . Mfr. Rope, Twine and Banding . . . . . .
. . . . . 809 Stafford Rd., Fall River, Mass . . Oct. 2, 1902.
George W. Towne . . . Bibb Mfg. Co. Columbus Mill . . . Columbus, Ga. . . . Oct. 26, 1892.
Edward B. Townsend, . Treas. Warwick Mills, ...
. . . . . 27 Kilby St., Boston, Mass. . . . Apr. 25, 1901.
D. Irving Trainer . . . Agt. Lincoln Mfg. Co. . . . . Chester, Pa. . . . . Apr. 23, 1903.
Robert B. Treat . . . . Prest. and Treas. Manufacturers Fuel Co. of Rhode Island .
. . . . . 1032 Banigan Bldg., Providence, R. I. . . Sept. 27, 1894.
W. S. Trickett . . . . Supt. Attawaugan Co. . . . . Montville, Conn. . . Sept. 21, 1905.
C. H. Truesdell . . . . Supt. Attawaugan Co. . . . . Killingly, Conn. . . Oct. 29, 1884.
Edmund E. Truesdell . Supt. China, Webster & Pembroke Mills . . . . . .
. . . . . Suncook, N. H. . . . Apr. 26, 1876.
Oscar B. Truesdell . . . . . 18 Washington Terrace, Newtonville, Mass. . Oct. 15, 1873.
Frank S. Tucker . . . Supt. The Clark Mile End Spool Cotton Co. . . . . .
. . . . . East Newark, N. J. . Apr. 26, 1906.
George E. Tucker . . . Agt. Otis Co. . . . . Ware, Mass. . . . . Oct. 25, 1895.
Philip S. Tuley . . . Prest. and Treas. Louisville Cotton Mills Co. . . . . .
. . . . . McHenry St., Louisville, Ky. . . . Oct. 18, 1900.
Harry Tunstall . . . . Supt. Wm. Clark Mills American Thread Co. . . . . .
. . . . . Westerly, R. I. . . . Sept. 21, 1905.
George W. Turner . . Supt. Argo Mills Co. . . . . Gloucester City, N. J. Apr. 26, 1900.
William L. Turner . . Prest. North American Lace Co. . . . . .
. . . . . Eighth and Allegheny Ave., Philadelphia, Pa. . . Sept. 21, 1905.
William D. Twiss . . . Supt. Everett Mills . . . . . Lawrence, Mass. . . April 29, 1896.

Fenwick Umpleby . . Instr. Lowell Textile School . . . . Lowell, Mass. . . . Apr. 27, 1905.
Fred Unger . . . . . Supt. I. E. Palmer Mills . . . . . Middletown, Conn . Apr. 26, 1906.
Charles T. Upton . . . . . 63 Mt. Vernon St., Lowell, Mass. . . . Apr. 28, 1897.

George A. Vaughan . . Supt. The Putnam Manufg. Co. . . Putnam, Conn. . . . Sept. 22, 1896.
William P. Vaughan . Agt. Putnam Manufacturing Co. . . . . .
. . . . . 1041 Banigan Building, Providence, R. I. . . Sept. 29, 1898.
Frank P. Vogl . . . . Agt. Monadnock Mills . . . . . Claremont, N. H. . . Sept. 27, 1894.

Jude C. Wadleigh . . . Agt. Merrimack Mfg. Co. . . . . Lowell, Mass. . . . Oct. 26, 1892.
Herbert E. Walmsley . Agt. Wamsutta Mills . . . . . New Bedford, Mass. . Oct. 29, 1890.
Robinson Walmsley . . Supt. Tecumseh Mills, P. O. Box 246, Fall River, Mass. . . Apr. 27, 1899.
Frederick T. Walsh . . Mgr. Thomas Leyland & Co., Dyestuffs, etc. . . . . .
. . . . . 195 Nesmith St., Lowell, Mass. . . . Apr. 28, 1897.

Joseph Wasserman . . Member of firm Philadelphia Tapestry Mills, ... Allegheny Ave. and Front St. Philedelphia, Pa. . . Apr. 26, 1906.
Frederick E. Waterman Treas. Stafford Mills & Cornell Mills, Fall River, Mass. . . Sept. 22, 1904.
Joseph Watters . . . . Supt. Osborn Mills . . . . . Fall River, Mass. . . Oct. 15, 1873.
F. E. Wattles . . . . Agt. Boscawen Mills . . . . . Penacook, N. H. . . Oct. 5, 1899.
Wm. T. Westerman . . Mgr. Ontario Spinning Co. . . . . 1729 Philip St., Philadelphia, Pa. . . Oct. 1, 1903.
W. B. Smith Whaley . Mechanical & Mill Engineer, ... 1012 Tremont Bldg., Boston, Mass. . . . Apr. 24, 1895.
Channing Whitaker . . Infringement and Patentability of Inventions . . . . . Lowell Machine Shop . . . . . Lowell, Mass. . . . Oct. 15, 1873.
James S. Whitaker . . Mgr. William Whitaker & Sons . . . . . 308 Mariners and Merchants Bldg., Third and Chestnut Sts., Philadelphia, Pa. . . Sept. 21, 1905.
A. Tenny White . . . Supt. Manville Co. . . . . Manville, R. I. . . . Oct. 27, 1887.
Alphonso F. White . . Supt. Forestdale Mfg. Co., ... Forestdale, R. I. . . Apr. 24, 1902.
W. T. Whitehead . . . Mgr. Dominion Textile Co. . . . . Montreal P. Q., Canada, Apr 26, 1906.
Arthur F. Whitin . . . Prest. Saunders Cotton Mills . . . Whitinsville, Mass. . Apr. 24, 1895.
Fred B. Whitin . . . . Agt. Uxbridge Cotton Mills . . . . North Uxbridge, Mass., Apr. 28, 1897.
Henry T. Whitin . . . Treas. Paul Whitin Manufg. Co. . . Northbridge, Mass. . Apr. 25, 1877.
James Earle Whitin . . Treas. Uxbridge Cotton Mills . . . North Uxbridge, Mass., Apr. 23, 1903.
Paul Whitin . . . . . Asst. Treas. Paul Whitin Mfg. Co. . Northbridge, Mass. . Oct. 1, 1903.
Clarence Whitman . . Treas. Wilkesbarre Lace Mfg. Co. . . . . Leonard St., New York City . . . Apr. 26, 1906.
William Whitman . . Prest. Arlington Mills, 78 Chauncy St. . . . . P. O. Box 100, Essex St. Station, Boston, Mass. . . . . Apr. 25, 1901.
William S. Whitney . . Supervising Engineer, American Woolen Co. . . . . Lawrence, Mass. . . Apr. 24, 1878.
Arthur Whittam . . . Care James E. Mitchell Co. . . . . 73 Leonard St., New York, N. Y. . . Apr. 27, 1898.
George F. Whitten . . . . . Manchester, N. H. . Oct. 26, 1892.
John H. Whitten . . . Agt. Stark Mills . . . . . Manchester, N. H. . Apr. 27, 1898.
W. R. B. Whittier . . Mgr. Whittier Mills . . . Chattahoochee, Fulton Co., Ga. . Oct. 18, 1900.
George A. Wies . . . . Treas. Eureka Fire Hose Co. . . . . 13 Barclay St., New York City . . . Apr. 24, 1902.
R. W. Wight, ... Asst. Treas. Indian Orchard Co. . . . . P. O. Box 13, Indian Orchard, Mass., Apr. 28, 1904.
Edward B. Wilbur . . Vice Prest. & Supt. Mollohon Mfg. Co. Newberry, S. C. . . . Oct. 30, 1889.
Benjamin Wilcox . . . Treas. City Mfg. Co. . . . . New Bedford, Mass. . Apr. 26, 1900.
John B. Wild . . . . Prest. Oneita Knitting Mills . . . . . 842 Bleecker St., Utica, N. Y. . . . . Apr. 26, 1900.
Eben C. Willey . . . . Supt. Barnaby Mfg. Co. . . . . 110 June St., Fall River, Mass. . . Apr. 29, 1896.
Franklin D. Williams . Asst. Treas. Hamilton Mfg. Co. . . 70 Kilby St. Room 48 . . . . . Boston, Mass. . . . . Apr. 25, 1901.
Henry Williams . . . Supt. Canoe River Mill, 53 Broadway, Taunton, Mass. . . . Apr. 23, 1903.
Broadus E. Willingham, Sec. and Treas. Willingham Cotton Mills . . . . . Macon, Ga. . . . . Oct. 18, 1900.

Elias S. Willis . . . . Supt. N. E. Cotton Yarn Co. . . . . Taunton, Mass. . . Apr. 23, 1903.
William E. Winchester . Director Mississippi Textile School, Agricultural College, Miss. Apr. 24, 1902.
Samuel F. Winsper . . Supt. City Mfg. Co. . . . . New Bedford, Mass. . Apr. 23, 1903.
Rex G. Witherbee . . Asst. Supt. Utica Steam and Mohawk Valley Cotton Mills . . . . . Utica N. Y. . . . . Apr. 26, 1906.
Charles W. Wood . . . Mills Mgr. U. S. Cotton Duck Corporation . . . . . 809 Continental Trust Building, Baltimore, Md. . . . Sept. 21, 1905.
George Wood . . . . Prest. and Treas. Millville Manufg. Co. . . . . 626 Chestnut St., Philadelphia, Pa. . . Oct. 16, 1872.
John P. Wood . . . . . 521 N. 22d St., Philadelphia, Pa. . . Apr. 28, 1897.
Oscar W. Wood . . . Treas. Germantown Spinning Co. . . . . High St., Germantown, Philadelphia, Pa. . . Oct. 18, 1900.
William P. Wood . . . Supt. Royal Weaving Co. . . . . Pawtucket, R. I. . . Apr. 26, 1906.
Marcus J. Woodrow . . Supt. Clinton Mfg. Co., 93 Clinton St., Woonsocket, R. I. . Apr. 26, 1906.
Wm. I. Woodward . . Agt. Shetucket Co., ... Norwich, Conn. . . Apr. 23, 1903.
Frank F. Wooley . . . Supt. Coventry Co. . . . . Anthony, R. I. . . . Apr. 27, 1905.
George W. Wright . . Supt. Shove Mills . . . . . Fall River, Mass. . . Apr. 26, 1906.

Adelbert R. Young . . Supt. Ashland Cotton Co. . . . . Jewett City, Conn. . . Apr. 25, 1894.
James M. Young . . . Mgr. Hamilton Cotton Co. . . . . Hamilton, Ont., Can. Apr. 27, 1899.
Lewis J. Young . . . . Supt. Gault Mills of Montreal Cotton Co. . . . . Lock Box 240, Valleyfield, P. Q., Canada . . . . . Oct. 1, 1903.

ASSOCIATE MEMBERS.

Eugene C. Andres . . Exporter and Importer . . . . . 517 John Hancock Building, Boston, Mass. . . . . Oct. 18, 1900.
Henry B. Ashton . . . Agt. S. A. Felton & Son Co. . . . . Manet Road, Chestnut Hill, Mass. Apr. 26, 1900.
Henry Ashworth . . . Agt. of Elijah Ashworth, Mfr. of Card Clothing . . . . . 89 Globe Mills Ave., Box 427, Fall River, Mass. . . Apr. 28, 1897.

George R. Babbitt . . . Prest. and Gen. Mgr. American Oil Co. and Prest. and Treas. . . . . The Burke Eng. Co., 182 So. Water St., Providence, R. I. . Apr. 24, 1895.
Harry Gage Baker . . Lowell Machine Shop & Kitson Machine Shop . . . . . Lowell, Mass. . . . Sept. 21, 1905.
D. C. Ball . . . . . 5 Beekman St., New York, N. Y. . . Oct. 25, 1895.
Edwin Barnes . . . . Vice Prest. American Textile Appliances Co. . . . . 79 Milk St., Boston, Mass. . . . . Apr. 26, 1900.
George S. Barnum . . Sec. and Treas. The Bigelow Co. . New Haven, Conn. . Apr. 24, 1895.
Colin C. Bell . . . . Vice-Prest. American Vulcanized Fibre Co. . . . . 12 Pearl St., Boston, Mass. . . . Apr. 29, 1896.
Frank P. Bennett . . . Publisher American Wool and Cotton Reporter . . . . . 530 Atlantic Ave., Boston, Mass. . . . Sept. 22, 1896.
William H. Bent . . . Treas. Mason Machine Works . . . Taunton, Mass. . . . April 29, 1896.
Edward H. Best . . . Woolen Merchant, 224 Purchase St., Boston, Mass. . . Apr. 23, 1903.

Albert Birch . . . . . Prop. & Mgr. Birch Bros. Co., ... 32 Kent St. Somerville, Mass. . . Oct. 2, 1902.

F. H. Bishop . . . . . Gen. Mgr. Universal Winding Co. . . . . 95 South St., Boston, Mass. . . . . Apr. 26, 1900.

Edmund E. Blake . . Selling Agt. Saco & Pettee Machine Shops Biddeford, Me. . Oct. 2, 1902.

Charles A. Bowen . . Treas. & Gen. Mgr., S. C. Lowe Supply Co. . . . . 87 Union St., New Bedford, Mass. . Apr. 26, 1906.

Arthur T. Bradlee, . . Mem. firm of Harding, Whitman & Co. . . . . 78 Chauncy St., Boston, Mass. . . . . Apr. 25, 1901.

J. Payson Bradley . . . The Kehew Bradley Co. . . . . P. O. Box 3037, 24 Purchase St., Boston, Mass. . . . Apr. 24, 1895.

J. Frank Braids . . . . Vice Prest. Charles S. Bush Co. . . . . P. O. Box 20, 212 Weybosset St., Providence, R. I. . . Apr. 28, 1897.

Samuel N. Braman . . Engineer Westinghouse Machine Co. . . . . 131 State St., Boston, Mass. . . . Apr. 27, 1905.

Henry Gordon Brinckerhoff, N. E. Mgr. Green Fuel Economizer Co., ... Room 1053, Exchange Bldg., 53 State St., Boston, Mass. Sept. 22, 1896.

Harry S. Brown . . . New England Mgr. Power Specialty Co. . . . . 10 Postoffice Square, Boston, Mass. . . . Sept. 21, 1905.

H. Martin Brown . . . Treas. U. S. Bobbin & Shuttle Co. . Providence, R. I. . . . Apr. 24, 1895.

George L. Brownell . . Inventor and Builder of Improved Twisting Machinery . . . . . 49 Union St., Station A, Worcester, Mass. . . Apr. 23, 1903.

Percy H. Brundage . . . . . 49 Wall St., New York, N. Y. . Oct. 5, 1899.

John H. Burghardt . . Page Belting Co. . . . 31 Pearl St., Boston, Mass. . . . Apr. 24, 1895.

Charles B. Burleigh . . Textile Power Dept., General Electric Co. . . . . 84 State St., Boston, Mass. . . Oct. 1, 1903.

Eugene E. Burnham . . Belt Mfr. . . . . 252 Lowell St., Lawrence, Mass. . . Oct. 25, 1895.

Arthur Cecil Butler, . . Agt. for E. A. Leigh, ... 232 Summer St. Boston, Mass. Apr. 28, 1904.

Harry W. Butterworth . Sec. H. W. Butterworth & Sons . . . . . York and Cedar Sts., Philadelphia, Pa. . . Oct. 28, 1897.

James Butterworth . Prest. H. W. Butterworth & Sons . . . . . York and Cedar Sts., Philadelphia, Pa. . . Apr. 24, 1895.

L. W. Campbell, . . . Agt. Woonsocket Machine and Press Co. . . . . Woonsocket, R. I. . . Sept. 22, 1904.

Malcolm Campbell . . Gen. Mgr. Woonsocket Machine and Press Co. . . . . Woonsocket, R. I. . . Apr. 24, 1895.

W. W. Carey . . . . . Mfr. Wood Rim Pulleys and Wood Working Machinery . . . . . 514 Broadway, Lowell, Mass. . . . . Apr. 24, 1895.

Albert C. Case . . . . . 5 Nassau St., New York, N. Y. . . Sept. 26, 1901.

Charles F. Chase . . . Eastern Mgr. Cling Surface Co., ... 39 Cortlandt St., New York, N. Y. . Sept. 21, 1905.

J. E. Cheesman . . . . Prest. Cheesman Cotton Gin Co. . . . . 76 William St., New York, N. Y. . . Oct. 5, 1899.

Charles H. Child . . . Treas. Standard Mill Supply Co. . . . . P. O. Box 1426, 39 Exchange Place, Providence, R. I. . . Apr. 24, 1895.

Melvin H. Coffin . . . Selling Agt. Whitin Machine Works Whitinsville, Mass. . Oct. 2, 1902.
Howard D. Colman . . Prest. and Treas. Barber-Coleman Co. Rockford, Ill. . . . Apr. 27, 1905.
Charles C. Cowan . . . . . 27 William St., New York, N. Y. . . Oct. 5, 1899.
Thomas G. Cox . . . . Selling Agt. Mason Machine Works . . . . . P. O. Box 316, Taunton, Mass. . . . Apr. 24, 1895.
Stewart W. Cramer . . Southern Agt., The Whitin Machine Works . . . . . Woonsocket Machine & Press Co. . Charlottee, N. C. . . Apr. 26, 1906.
Randolph Crompton . . Mem. firm of Crompton-ThayerLoom Co. . . . . Worcester, Mass. . . Oct. 28, 1897.
C. F. Curwen . . . . Treas. Dinsmore Mfg. Co. . . . . Salem, Mass. . . . . Apr. 27, 1899.
Joseph L. Cushing . . Prop.Daniel Cushing & Co., Box 885, Lowell, Mass. . . . Apr. 26, 1900.

Frederick I. Dana . . . Gen. Sales Mgr., The Textile Machinery Finishing Co. . . . . Providence, R. I. . . . Apr. 24, 1895.
H. M. Daniel . . . . Philadelphia Mgr. The Mayo Mills and The Avalon Mills . . . . . 517 The Bourse, Philadelphia, Pa. . . Sept. 21, 1905.
Daniel J. Danker, . . . Mem. firm of Danker & Marston, Importers of dyestuffs and . . . . . chemicals . . 247 Atlantic Ave., Boston, Mass. . . . Apr. 28, 1904.
Charles Henry Davis . C. E., Charles Henry Davis & Partners, ... 25 Broad St., New York, N. Y. . . Apr. 23, 1903.
Hugh De Haven . . . Prop. De Haven Mfg. Co. . . . . 50-54 Columbia Heights, Brooklyn, N. Y. . . Apr. 23, 1903.
John O. DeWolf, . . . Mech. Engineer, 159 Devonshire St., Boston, Mass. . . . Apr. 25, 1901.
Frederick N. Dillon . . D. M. Dillon Steam Boiler Works . Fitchburg, Mass. . . Sept. 22, 1904.
Ezra Dixon . . . . . Prest. and Treas. Dixon Lubricating Saddle Co. Bristol, R. I. Sept. 21, 1905.
Robert D. Douglas . . Cop Tube Manufacturer . . . . . P. O. Box 704, 402 Bay St., Fall River, Mass. . . Sept. 21, 1905.
C. E. W. Dow . . . . Selling Agt. American Moistening Co. . . . . 79 Milk St., Boston, Mass. . . . Apr. 24. 1895.
Frederick A. Downes . Prest. Keystone Mutual Fire Insurance Co. . . . . 925 Chestnut St., Philadelphia, Pa. . . Oct. 28, 1897.
Clare H. Draper . . . Experimental Dept. Draper Co. . . Hopedale, Mass. . . Sept. 21, 1905.
W. L. Draper . . . . Factory Buildings Trust, 253 A St., South Boston, Mass. Oct. 18, 1900.

Charles E. Eager . . . Member firm J. Russel Marble & Co. . . . . 124 High St., Boston, Mass. . . . Apr. 27, 1905.
Fred W. Easton, . . . Treas. Easton & Burnham Machine Co., ... 180 Weeden St., Pawtucket, R. I. . . Apr. 25, 1901.
WilliamDresserEdwards,Cons. Eng. Randolph Bldg. . . . . Memphis, Tenn. . . Oct. 2, 1902.
G. B. Emmons . . . . Prest. Emmons Loom Harness Co. . . . . 7 May St., Lawrence, Mass. . . Oct. 25, 1895.
George P. Erhard . . . Vice-Prest. The Geo. W. Stafford Co. Readville, Mass. . . Apr. 27, 1905.

D. D. Felton . . . . . Treas. S. A. Felton & Son Co. . . . Manchester, N. H. . Apr. 24, 1895.
John W. Ferguson . . Contractor . . . . . Paterson Nat. Bank Bldg., Paterson, N. J. . . . Apr. 24, 1895.

L. L. Flemming . . . Vice-Prest. and Gen. Mgr. American Cotton Co. . . . . 25 Broad St., Lock Box 240, New York, N. Y. . . Apr. 23, 1903.
E. C. Foerster . . . . Treas. American Textile Specialty Machinery Co. . . . . 363-373 Rider Ave., New York, N. Y. . . Sept. 22, 1904.
J. Herbert Foster . . . Cotton Broker . 10 South Water St., Providence, R. I. . . . Apr. 24, 1895.
E. T. Fowler . . . . . Treas. and Mgr. Foster Machine Co., Westfield, Mass. . . Apr. 26, 1906.
John T. Fyans . . . . Agt. Fyans, Frazer & Blackway Co. . . . . 411 Beach St., Fall River, Mass. . . Apr. 28, 1897.
H. P. Garland . . . . Treas. Garland Mfg. Co. . . . . Saco, Me. . . . . Oct. 25, 1895.
Royal W. Gates . . . . Supply Dealer . . . 307 Market St.,Lowell, Mass. . . . Apr. 24, 1895.
Vladimir F. Gnesin . . Care, The Great Yaroslavl Mfg. Co. Moscow, Russia . . . Oct. 1, 1903.
Rufus B. Goff . . . . Prest. Standard Mill Supply Co. . . . . 77 Exchange Pl., Box 714, Providence, R. I. . . Apr. 28, 1897.
Arthur F. Gray . . . . Architect and Mill Engineer . . . . . 53 State St., Room 509, Boston, Mass. . . . Oct. 18, 1900.
Samuel M. Green, C. E. The American Thread Co. . . . . Holyoke, Mass. . . . Apr. 24, 1902.
Harry S. Greene . . . Vice Prest. Woonsocket Napping Machinery Co. . . . . Woonsocket, R. I. . . . Apr. 26, 1906.
Henry S. Greene, . . . Treas. Woonsocket Napping Machinery Co. . . . . Woonsocket, R. I. . Apr. 26, 1906.
S. Harold Greene . . . Starch Manufacturer . . 367 Atlantic Ave. Boston, Mass. . Apr. 27, 1905.
Russell Grinnell . . . Vice Prest. Gen. Fire Extinguisher Co. . . . . P. O. Box 89, Providence, R. I. . . . Apr. 26, 1906.

A. Walter Harris . . . Treas. A. W. Harris Oil Co. . . . . Box 758, 326 So. Water St., Providence, R. I. . . Oct. 25, 1895.
Alfred H. Hartley . . Dealer in Oils and Mill Supplies . . . . . Box 409, Fall River, Mass. . . Oct. 28, 1897.
Edgar F. Hathaway . . Gen. Mgr., American Warp Drawing Machines . . . . . 289 A St., Boston, Mass. . . . Apr. 27, 1905.
Charles C. Hedrick . . Mech. Eng. Lowell Machine Shop . Lowell, Mass. . . . Apr. 23, 1903.
Richard H. Hill . . . Gen. Sales Agt. James Hunter Machine Co. . . . . 70 Kilby St., Boston, Mass. . . . . Apr. 26, 1900.
John Hogg . . . . . Smith, Hogg & Gardiner, 144 Essex St., Boston, Mass. . . . Apr. 27, 1899.
Henry S. Houghton, Sr., Mfr. Grids and Beaters, 61 Pond St., Woonsocket, R. I. . Apr. 28, 1897.
Lewis T. Houghton . . Mfr. Metal Thread Boards . . . . . 89 Exchange St., Worcester, Mass. . . Sept. 26, 1901.
A. H. Howard . . . . Prest. and Treas. Howard Bros. Mfg. Co. . . . . P. O. Box 54, Worcester, Mass. . . Sept. 26, 1901.
Frederic W. Howe . . Mgr. Providence Dept., Crompton & Knowles Loom Works . . . . . 241 Harris Ave., Box 899, Providence, R. I. . . Apr. 24, 1902.
C. H. Hutchins . . . . Prest. Crompton & Knowles Loom Works . . . . . Worcester, Mass. . . Oct. 25, 1895.
Daniel Jackson . . . . Cotton Buyer B. B. and R. Knight, . Providence, R. I. . . Apr. 24, 1902.

David Jackson . . . . Gen. Mgr. Jackson Pat. Shell Roll Co., Pawtucket, R. I. . . Apr. 24, 1895.
Albert A. Jenks . . . Prest. Fales & Jenks Machine Co. . Pawtucket, R. I. . . Sept. 21, 1905.

Lawrence M. Keeler . Whitin Machine Works . . . . . Whitinsville, Mass. . Sept. 26, 1901.
William B. Kehew . . The Kehew-Bradley Co., ...
. . . . . 24 Purchase St., Boston, Mass. . . . Apr. 24, 1895.
John E. Kendrick . . . Prest. American Supply Co., Box 822, Providence, R. I. . . Oct. 5, 1899.
Frank B. Kenney . . . Mgr. Care of T. C. Entwistle Co. . . . . .
. . . . . 297 Market St., Lowell, Mass. . . . Oct. 5, 1899.
Joseph C. King . . . . Ring Traveler . . . 133 Essex St., Boston, Mass. . . . Oct. 1, 1903.

W. C. Langford . . . Salesman, ... 14 Peck St., Providence, R. I. . . Apr. 27, 1899.
Josiah M. Lasell . . . Whitin Machine Works, ... Whitinsville, Mass. . Apr. 24, 1895.
John H. Lawrence . . Top Roll Mfr. . . . . New Bedford, Mass. . Apr. 28, 1904.
Frank A. LeValley . . Cotton Broker . . . . . Fall River, Mass. . . Apr. 28, 1904.
John H. Lorimer . . . Builder of Textile Machines . . . . . .
. . . . . Ontario and Lawrence Sts., Philadelphia, Pa. . . Oct. 28, 1897.
Stephen C. Lowe . . . Agt. John Hetherington & Sons, Ltd., ...
. . . . . 186 Devonshire St., Boston, Mass. . . . Oct. 25, 1895.
Rowland N. Mackay . Agt. The George W. Stafford Co., . Readville, Mass. . . Sept. 21, 1905.
Francis E. Macomber . Mill Supplies . . . . 88 Broad St., Boston, Mass. . . . . Apr. 26, 1900.
John P. Marston . . . Mem. of firm Danker & Marston . . . . . .
. . . . . 247 Atlantic Ave., Boston, Mass. . . . . Apr. 28, 1904.
Fay H. Martin . . . . Prest. Textile Machinery Co. . . . . .
. . . . . 60 India St., Boston, Mass. . . . . Sept. 26, 1901.
Henry W. Mason . . . Cotton Dealer, . 10 South Water St., Providence, R. I. . . Apr. 27, 1905.
F. H. Maynard . . . . Prest. Mgr. Gen. Fire Extinguisher Co. . . . . .
. . . . . Providence, R. I. . . Apr. 24, 1895.
John McCullough, . . . Cotton Waste Merchant . . . . . New Bedford, Mass. . April 25, 1901.
H. G. McKerrow . . . Textile Machinery Importer . . . . . .
. . . . . 31 State St., Boston, Mass. . . . Sept. 22, 1896.
D. K. McLaren . . . . Mfr. of Leather Belting 751 Craig St., Montreal, P. Q., Can. Apr. 26, 1900.
Meldon H. Merrill . . Eng. Westinghouse Elec. & Mfg. Co., ...
. . . . . 716 Board of Trade Bldg. Boston, Mass. . . . . Sept. 22, 1904.
Charles B. Moore . . . Mgr. Knowles Steam Pump Works . . . . . .
. . . . . 54 Oliver St., Boston, Mass. . . . . Apr. 26, 1900.
S. F. B. Morse . . . . Prest. Southern Cotton Corporation . . . . . .
. . . . . 74 Broadway, New York, . . N. Y. Sept. 22, 1904.
Fred Moss . . . . . Holland & Webb, Commission Merchants . . . . . .
. . . . . 495 Broome St., New York, N. Y. . . Sept. 21, 1905.
Hugh Nelson . . . . Mgr. Casualty Co. of America . . . . . .
. . . . . 52 William St., New York City . . Apr. 26, 1906.
John H. Nelson . . . . Treas. William Firth Co. . . . . .
. . . . . 60 Baltimore St., Lynn, Mass. . . . . Apr. 26, 1900

Charles H. Newman . . Webster Mfg. Co. 88 & 90 Reade St., New York, N. Y. . . Sept. 21, 1905.
William R. Noone Jos. Noone's Sons Co. . . 102 South St., Boston, Mass. . . . Oct. 28, 1897.

Thos. J. O'Keefe . . . Mgr. Charles L. Ireson . . . . . 148 High St., Boston, Mass. . . . . Apr. 28, 1904.

Sidney B. Paine . . . General Electric Co. . . 84 State St., Boston, Mass. . . . Apr. 24, 1895.
William F. Parish, Jr. . Chief Engineer, Deutsche Vacuum Oil Co. . . . . Berlin, N. W. 7 Reichstagsufer 16, Germany, Apr. 24, 1902.
Arthur Parkinson . . . Selling Agt. Arabol Mfg. Co. . . . . 100 William St., New York, N. Y. . . Apr. 28, 1897.
John Parmenides . . . Choremi, Benachi & Co., 50 State St., Boston, Mass. . . . . Apr. 27, 1905.
Stephen Minot Pitman . Sec'y Narragansett Mutual Fire Insurance Co. . . . . 721 Banigan Bldg., Box 315, Providence, R. I. . . Apr. 24, 1895.
James C. Potter . . . . Prest. of Potter & Johnson Co. . . . Pawtucket, R. I. . . Sept. 21, 1905.
Charles A. M. Praray . Chas. A. M. Praray & Co., Architect and Mill Engineer . . . . . 48 Weybosset St., Providence, R. I. . . Apr. 28, 1897.
Charles F. Pray . . . . Cloth Broker . . . 66 Leonard St., New York, N. Y. . . Apr. 28, 1904.
James M. Pendergast . J. M. Pendergast & Co., Brokers in Cotton Cloths and Yarns . . . . . 87 Milk St., Boston, Mass. . . . Apr. 26, 1906.
Theodore H. Price . . Cotton Dealer . . . 82 Beaver St., New York, N. Y. . . Oct. 2, 1902.

Frank W. Reynolds . . Mem. firm Lockwood Greene & Co. . . . . 93 Federal St., Boston, Mass. . . . Apr. 28, 1904.
Peleg A. Rhodes . . . Sec. Cotton Mill Mutual Fire Insurance Co. . . . . Augusta, Ga. . . . . Oct. 5, 1899.
Richard H. Rice . . . Engineer Turbine Dept. Gen. Elec. Co. West Lynn, Mass. . . Apr. 24, 1895.
E. R. Richardson . . . Asst. Treas. Howard & Bullough American Machine Co., Ltd. . . . . Box 678, Pawtucket, R. I. . . Apr. 26, 1900.
C. E. Roberts . . . . Mgr. Hartford Steam Boiler Inspection & Insurance Co. . . . . 101 Milk St., Room 400, Boston, Mass. . . . Apr. 24, 1895.
Elwin H. Rooney . . . The Whitin Machine Works . . . Whitinsville, Mass. . Apr. 26, 1906.
E .A. Rusden . . . . Gen. Mgr. Textile Finishing Machinery Co. . . . . 17 Exchange Place, Providence, R. I. . . Sept. 21, 1905.

J. L. Sanford . . . . . Acting Mgr. Barber-Colman Co. . . . . 77-79 Washington St., North, Boston, Mass. . . . Apr. 27, 1905.
William B. Scofield . . Sec'y Crompton-Thayer Loom Co. . Worcester, Mass. . Apr. 28, 1904.
Dwight Seabury . . . Mill Engineer . . . 12 East Ave., Pawtucket, R. I. . . Apr. 25, 1901.
Frederick P. Shaw . . Prest. and Gen. Mgr. Shaw Machine Co. . . . . Lowell, Mass. . . . Apr. 26, 1906.

William N. Shaw . . . Treas. The Lincoln Iron Works and Jackson Architectural Iron Works . . 31 E. 17th St., New York, N. Y. . . Apr. 24, 1902.
Lewis T. Shurtleff . . . Agt. Paper Department, Pairpont Corporation, New Bedford, Mass. Apr. 28, 1904.
Harry M. Smith . . . Vice-Prest. Standard Mill Supply Co. 77 Exchange Pl., Box 714, Providence, R. I. . . Apr. 28, 1897.
R. Paul Snelling . . . Treas. Saco and Pettee Machine Shops Newton Upper Falls, Mass. . Sept. 22, 1896.
W. A. Spellissy . . . . of Dolier & Co., Yarn Commission Merchants Mariner and Merchants Building, Philadelphia, Pa. . . Sept. 21, 1905.
Henry C. Spence . . . Gen. Mgr. Metallic Drawing Roll Co. Indian Orchard, Mass. Apr. 24, 1895.
Wallace I. Stimpson . Salesman The Draper Co. . . . . Hopedale, Mass. . . Sept. 21, 1905.
James Strang . . . . Selling Agt. Metallic Drawing Roll Co. 123 Hampden St., Indian Orchard, Mass. Oct. 28, 1897.
Jacob Stephans . . . . Gen. Mgr. William H. Haskell Mfg. Co. Pawtucket, R. I. . . Apr. 26, 1906.
Daniel J. Sully . . . . Cotton Broker, T. M. Reynolds & Co., 34 South Water St., Providence, R. I. . . Apr. 24, 1895.
E. Kent Swift . . . . Whitin Machine Works, ... Whitinsville Mass. . . Apr. 27, 1905.
John Sykes, J. P. . . . Prest. English Card Clothing Co. Acre House, Huddersfield, Eng. . Oct. 18, 1900.

Charles F. Taylor . . . Prop. Burgess Cop Tube Co., 15 Custom House St., Providence, R. I. . . Apr. 27, 1898.
Elwood E. Taylor . . . N. E. Mgr., Stoker Dept. Amer. Ship Windlass Co. of Providence, R. I., 12 Humbolt Ave., Boston, Mass. . . . Apr. 23, 1903.
Robert Taylor, Jr. . . Managing Director Soho Iron Wks., Oldham, England . . Apr. 28, 1904.
George C. Tewksbury . Agt. American Ship Windlass Co. 141 Milk St., Room 1102 Boston, Mass. . . . Apr. 24, 1902.
James T. Thornton . . Treas. Thornton Machinery Co. . . Providence, R. I. . . Oct. 18, 1900.
William V. Threlfall . Chapman Valve Mfg. Co. . . . . Indian Orchard, Mass., Apr. 24, 1895.
Rienzi Thurston, . . . Mach. Mfr. . . . . Fall River, Mass. . . Oct. 18, 1900.
H. A. Tillinghast, . . . Sec'y & Treas. The Textile Finishing Mach. Co. Providence, R. I. . . Apr. 25, 1901.
A. Curtis Tingley . . . Treas. National Ring Traveler Co. 257 West Exchange St., Providence, R. I. . . Sept. 22, 1896.
Allison W. Trafford . . Mfr. of Ring Travelers 221–223 Pocasset St., Fall River, Mass. . . Apr. 26, 1900.

Frank H. Underwood . Resident Mgr. Dodge Mfg. Co. 137 Purchase St., Boston, Mass. . . . Apr. 29, 1896.

Clement A. Wakefield . Selling Agt. Saco & Pettee Machine Shops, 38 South St., Biddeford, Me. . . . Apr. 25, 1901.

Justin A. Ware . . . . . Spring Hill, Barnstable County, Mass. Oct. 25, 1895.
William Warr . . . . Engineer Robins' Conveying Belt Co., ...
. . . . . 53 State St., Boston, Mass. . . . . Apr. 27, 1905.
Lettice R. Washburn . Mill Contractor, 235 North Water St., New Bedford, Mass. . Oct. 5, 1899.
Walter S. Watson . . . Haworth & Watson, Mfrs. Paper Tubes for Textile Manufg.
. . . . . Box 996, Lowell, Mass. . . . . Oct. 25, 1895.
Sephen M. Weld, . . Stephen M. Weld & Co., 89 State St., Boston, Mass. . . . Apr. 27, 1899.
William R. West . . . Roll Coverer . . 830 Purchase St., New Bedford, Mass. . Sept. 22, 1896.
John K. Whittier . . . Supt. Kitson Machine Shop . . . . Lowell, Mass. . . . Sept. 21, 1905.
W. W. White . . . . Prest. Holyoke Machine Co. . . . Worcester, Mass. . . Apr. 27, 1899.
G. Marston Whitin . . Treas. Whitin Machine Works . . . Whitinsville, Mass. . Apr. 24, 1895.
Fred A. Wilde . . . . Agt. George W. Stafford Co. . . . Readville, Mass. . . Apr. 28, 1897.
Erving Yale Woolley . Sel. Agt. Stoddard, Haserick, Richards & Co. . . . . .
. . . . . 152 Congress St., Boston, Mass. . . . . Apr. 24, 1895.

Honorary Members	5
Life Members	12
Active Members	677
Associate Members	182
Total Membership	876

MEMBERS OF THE ASSOCIATION,

May 1, 1906.

ARRANGED BY STATES.

MAINE.

Auburn	William Hayes	Barker Mill.
Augusta	Albert S. Pratt	Edwards Mfg. Co.
Biddeford	Edmund E. Blake	Saco & Pettee Machine Shops.
Biddeford	Harry D. Lord	Saco & Pettee Machine Shops.
Biddeford	Robert McArthur	Pepperell Mfg. Co.
Biddeford	Clement A. Wakefield	Saco & Pettee Machine Shops.
Brunswick	Russell W. Eaton	Cabot Manufg. Co.
Kennebunk	Robert W. Lord	R. W. Lord & Co.
Lewiston	George W. Bean	Androscoggin Mills.
Lewiston	H. B. Estes	Continental Mills.
Lewiston	William D. Pennell	Hill Manufg. Co.
Lewiston	Herbert L. Pratt	Bates Manufg. Co.
Portland	Lyman M. Cousens	Dana Warp Mills.
Saco	H. P. Garland	Garland Mfg. Co.
Saco	James G. Garland	Garland Mfg. Co.
Saco	Elmer E. Page	York Manufg. Co.
Westbrook	Philip Dana	Dana Warp Mills.
Westbrook	Woodbury K. Dana	Dana Warp Mills.

NEW HAMPSHIRE.

Charlestown	Samuel Webber	Hydraulic Engineer.
Claremont	Frank P. Vogl	Monadnock Mills.
Dover	Charles H. Fish	Cocheco Manufg. Co.
Dover	Herbert W. Owen	Cocheco Manufg. Co.
Exeter	Chester D. Hatch	Exeter Mfg. Co.
Greenville	Frederick W. Ely	Columbian Manufg. Co.
Hooksett	Stephen N. Bourne	Dundee Mills.

Manchester	Henry Deane Bourne	Hooksett Manufg. Co.
Manchester	D. D. Felton	S. A. Felton & Son Co.
Manchester	Elliott Cowdin Lambert	Amoskeag Manufg. Co.
Manchester	Charles H. Manning	Amoskeag Manufg. Co.
Manchester	Herman F. Straw	Amoskeag Manufg. Co. & Manchester Mills.
Manchester	George F. Whitten	
Manchester	John H. Whitten	Stark Mills.
Milford	M. F. Foster	
Nashua	William F. Arthur	Nashua Manufacturing Co.
Nashua	William H. Cadwell	Jackson Co.
Nashua	Almon A. Milliken	The Jackson Co.
Nashua	Roscoe S. Milliken	Nashua Mfg. Co.
Newmarket	William H. Garner	Newmarket Mfg. Co.
Penacook	Marcellus Gould	N. H. Spinning Mills.
Penacook	F. E. Wattles	Boscawen Mills.
Peterboro	Albert W. Noone	Jos. Noone's Son's Co.
Pittsfield	William P. Adams	Pittsfield Mills.
Salmon Falls	J. Colby Lewis	Salmon Falls Mfg. Co.
Somersworth	Charles H. Plummer	Great Falls Manufg. Co.
Suncook	David L. Jewell	China, Webster & Pembroke Mills.
Suncook	Edmund E. Truesdell	China, Webster & Pembroke Mills.

VERMONT.

North Pownal	Thomas Armstrong	North Pownal Manufg. Co.

MASSACHUSETTS.

Adams	Joseph Brierley	W. C. Plunkett & Sons Warp Mill.
Adams	Z. D. Hall	Berkshire Cotton Manufg. Co.
Adams	Emil Kipper	Blackington Mfg. Co.
Adams	Charles T. Plunkett	Berkshire Cotton Manufg. Co.
Adams	William B. Plunkett	Berkshire Cotton Mfg. Co., and Greylock Mills.
Adams	William C. Plunkett	W. C. Plunkett & Sons.
Adams	J. N. Sanderson	Renfrew Mfg. Co.
Adams	Charles R. Thomson	Renfrew Mfg. Co.
Adamsdale	Fred B. Manley	Spencer Yarn Co.
Amesbury	M. W. Quinn	Hamilton Woolen Co.
Andover	John W. Bell	Smith & Dove Manufg. Co.
Blackstone	George E. Spofford	Blackstone Manufg. Co.
Bondsville	Elmer G. Childs	Boston Duck Co.
Bondsville	Samuel Stewart	Boston Duck Co.
Boston	Charles B. Amory	Hamilton Mfg. Co.
Boston	Frederic Amory	189 Devonshire St.
Boston	Eugene C. Andres	517 John Hancock Building.

Boston	E. W. Atkinson	Stoddard, Haserick, Richards & Co.
Boston	Nathaniel F. Ayer	10 P. O. Square.
Boston	Edwin Barnes	American Textile Appliances Co.
Boston	Colin C. Bell	American Vulcanized Fibre Co.
Boston	Albert Farwell Bemis	Jackson Fibre Co.
Boston	Frank P. Bennett	Am. Wool and Cotton Reporter.
Boston	Edward H. Best	Woolen Merchant.
Boston	F. H. Bishop	Universal Winding Co.
Boston	Arthur T. Bradlee	Harding, Whitman & Co.
Boston	J. Payson Bradley	The Kehew-Bradley Co.
Boston	Samuel N. Braman	Westinghouse Machine Co.
Boston	S. Parker Bremer	Monadnock Mills.
Boston	Henry Gordon Brinckerhoff	Green Fuel Economizer Co.
Boston	Harry S. Brown	New England Power Specialty Co.
Boston	John H. Burghardt	Page Belting Co.
Boston	Charles B. Burleigh	General Electric Co.
Boston	Arthur Cecil Butler	232 Summer St.
Boston	Frank B. Comins	American Moistening Co.
Boston	Alphonse S. Covel	Tremont and Suffolk Mills.
Boston	Daniel J. Danker	Danker & Marston.
Boston	Augustus De Cort	724 Exchange Building.
Boston	P. Y. DeNormandie	Pepperell Mfg. Co.
Boston	John O. DeWolf	159 Devonshire St.
Boston	C. E. W. Dow	150 Devonshire St.
Boston	Frederic C. Dumaine	Amoskeag Mfg. Co.
Boston	Charles E. Eager	J. Russel Marble & Co.
Boston	William Firth	Am. Moist. Co. and Wm. Firth Co.
Boston	Frederick O. Flather	Boott Mills.
Boston	Alfred M. Goodale	Cloth and Yarn Broker.
Boston	Arthur F. Gray	53 State St., Room 509.
Boston	Edwin Farnham Greene	Lockwood, Greene & Co. and Dwight Mfg. Co.
Boston	S. Harold Greene	Starch Mfg.
Boston	Edgar F. Hathaway	American Warp Drawing Machine Co
Boston	Richard H. Hill	Jas. Hunter Machine Co.
Boston	William H. Hill	Renfrew Mfg. Co.
Boston	Franklin W. Hobbs	Arlington Mills.
Boston	John Hogg	Smith, Hogg & Gardiner.
Boston	Henry S. Howe	Dry Goods Commission.
Boston	Charles W. Hubbard	Ludlow Mfg. Associates.
Boston	Otis L. Humphrey	78 Chauncy St.
Boston	Joseph B. Jamieson	Holmes Knitting Co.
Boston	William B. Kehew	The Kehew-Bradley Co.
Boston	Joseph C. King	Morley Button Mfg. Co.
Boston	Evan Arthur Leigh	232 Summer St.
Boston	William C. Lovering	Whittenton Mfg. Co.
Boston	Stephen C. Lowe	John Hetherington & Sons, Ltd.

Boston	Herbert Lyman	39 Beacon St.
Boston	Ronald T. Lyman	Boston Mfg. Co.
Boston	Francis E. Macomber	88 Broad St.
Boston	Charles T. Main	Dean & Main.
Boston	John P. Marston	Danker & Marston.
Boston	Fay H. Martin	Textile Machinery Co.
Boston	Fred C. McDuffie	24 Milk St.
Boston	H. G. McKerrow	31 State St.
Boston	Meldon H. Merrill	Westinghouse Elec. & Mfg. Co.
Boston	Charles B. Moore	Knowles Steam Pump Works.
Boston	George B. Morison	Ballou Yarn Co.
Boston	Robert W. Neff	Chemical Mfr.
Boston	William R. Noone	102 South St.
Boston	Thomas J. O'Keefe	148 High St.
Boston	John Parmenides	Choremi, Benachi & Co.
Boston	Benjamin C. Phipps	Merchant.
Boston	Sidney B. Paine	General Electric Co.
Boston	James M. Prendergast	J. M. Prendergast & Co.
Boston	Henry Smith Pritchett, LL.D.	Mass. Institute of Technology.
Boston	Frank W. Reynolds	Lockwood Greene & Co.
Boston	Charles E. Riley	C. E. Riley & Co.
Boston	C. E. Roberts	Hartford Steam Boiler Insp. & Ins.Co.
Boston	Arnold B. Sanford	Kennebec Spinning Mills.
Boston	J. L. Sanford	Barber-Colman Co.
Boston	J. Herbert Sawyer	93 Federal St.
Boston	George H. Shapley	Silver Lake Co.
Boston	William F. Sherman	294 Washington St.
Boston	John Sullivan	C. E. Riley & Co.
Boston	Elwood E. Taylor	Amer. Ship Windlass Co.
Boston	George C. Tewksbury	Amer. Ship Windlass Co.
Boston	James P. Tolman	Samson Cordage Works.
Boston	Edward B. Townsend	Warwick Mills.
Boston	Frank H. Underwood	Dodge Mfg. Co.
Boston	William Warr	Robins' Conveying Belt Co.
Boston	Stephen M. Weld	89 State St.
Boston	W. B. Smith Whaley	1012 Tremont Bldg.
Boston	William Whitman	Arlington Mills.
Boston	Franklin D. Williams	Hamilton Mfg. Co.
Boston	Erving Yale Woolley	Stoddard Haserick, Richards & Co.
Chelsea	Augustus T. Clark	American Circular Loom Co.
Chelsea	Eugene Finocchiaro	532 Broadway.
Chestnut Hill	Henry B. Ashton	Manet Road.
Chicopee	O. D. Drew	Dwight Mfg. Co.
Chicopee Falls	M. A. Rawlinson	Chicopee Mfg. Co.
Clinton	William G. McLoon	Lancaster Mills.
Clinton	Charles H. Richardson	Lancaster Mills.
Clinton	George P. Taylor	286 Chestnut St.

East Cambridge . . Ivers S. Adams . . . . . American Net and Twine Co.
East Dedham . . . Benjamin M. Earl . . . . Merchant Dye Works.
Easthampton . . . George A. Ayer . . . . . West Boylston Co.
Easthampton . . . Charles E. Childs . . . . West Boylston Co. & Hampton Co.
Easthampton . . . John Skinner . . . . . West Boylston Mfg. Co.
Fall River . . . . F. S. Akin . . . . . Cornell Mills.
Fall River . . . . Henry Ashworth . . . . Agt. for Card Clothing Manufr.
Fall River . . . . J. W. Bailey . . . . . Principal, The Bradford Durfee Textile School.
Fall River . . . . Edward E. Bartlett . . . Hargraves Mills.
Fall River . . . . William M. Batt . . . . . The Davol Mills.
Fall River . . . . John P. Bodge . . . . . Arkwright Mills.
Fall River . . . . Jefferson Borden, Jr. . . . Fall River Bleachery Co.
Fall River . . . . Nathaniel B. Borden . . . Barnard Manufg. Co.
Fall River . . . . Richard B. Borden . . . Richard Borden Mfg. Co.
Fall River . . . . James T. Broadbent . . . Bradford Durfee Textile School.
Fall River . . . . Isaac A. Brown . . . . . Narragansett Mills.
Fall River . . . . Simeon B. Chase . . . . King Philip Mills.
Fall River . . . . John A. Collins . . . . . American Linen Co.
Fall River . . . . Thomas D. Covel . . . . Davis Mills.
Fall River . . . . Frederick E. Cunneen . . Seaconnet Mills.
Fall River . . . . Bradford D. Davol . . . Barnard Manufg. Co.
Fall River . . . . George Delano . . . . . Bourne Mills.
Fall River . . . . Robert D. Douglas . . . 402 Bay St.
Fall River . . . . Frank H. Dwelly . . . . Tecumseh Mills.
Fall River . . . . David H. Dyer . . . . . D. H. Dyer & Son.
Fall River . . . . John H. Estes . . . . . Cotton Manufacturer.
Fall River . . . . William Evans . . . . . Hargraves Mills No. 1 and No. 2.
Fall River . . . . Charles F. Farrar . . . . 83 Warren St.
Fall River . . . . John T. Fyans . . . . . Fyans, Frazer & Blackway Co.
Fall River . . . . Arthur M. Hamilton . . .
Fall River . . . . John F. Hamlet . . . . . P. O. Box 160
Fall River . . . . Alfred H. Hartley . . . . Oils and Mill Supplies.
Fall River . . . . William Hathaway . . . . Barnard Mfg. Co.
Fall River . . . . William B. Hawes . . . . Yarn Broker.
Fall River . . . . George H. Hills . . . . . Davol Mills and Stevens Mfg. Co.
Fall River . . . . John H. Holt . . . . . Luther Mfg Co.
Fall River . . . . William P. Holt . . . . . 158 Jackson St.
Fall River . . . . John Kniveton . . . . . Bradford Durfee Textile School.
Fall River . . . . Frank A. Le Valley . . . Cotton Broker.
Fall River . . . . Leontine Lincoln . . . . Seaconnet Mills.
Fall River . . . . Charles B. Luther . . . . Luther Mfg. Co.
Fall River . . . . Alexander Makepeace . . Richard Borden Mfg. Co.
Fall River . . . . Arthur H. Mason . . . . Davis Mills.
Fall River . . . . Philip A. Mathewson . . . King Philip Mills.
Fall River . . . . Thomas McAuliffe . . . . Stevens Manufg. Co.
Fall River . . . . James A. McLane . . . . Davis Mills.

Fall River	William A. Nichols	120 Pine St., Fall River.
Fall River	Robert Place	Supt. Flint Mills.
Fall River	Joseph H. Potter, Jr.	Durfee Mills.
Fall River	John Bion Richards	Davis Mills.
Fall River	Harry J. Ricketson	Merchants' Mfg. Co.
Fall River	Benj. H. Roberts	163 Grove St.
Fall River	Charles M. Shove	Granite Mills.
Fall River	W. Frank Shove	Pocassett Mfg. Co.
Fall River	Abbott E. Slade	Laurel Lake Mills.
Fall River	J. C. Smith	Chace Mills.
Fall River	Timothy Sullivan	Stafford Mills.
Fall River	Richard Thackeray	Weetamoe Mills.
Fall River	James O. Thompson, Jr.	Wampanoag Mills.
Fall River	Rienzi W. Thurston	Machine Mfr.
Fall River	M. J. Toohey	Mfr. Rope, Twine and Banding.
Fall River	Allison W. Trafford	Mfr. Ring Travelers.
Fall River	Robinson Walmsley	Tecumseh Mills.
Fall River	Frederick E. Waterman	Stafford and Cornell Mills.
Fall River	Joseph Watters	Osborn Mills.
Fall River	Eben C. Willey	Barnaby Mfg. Co.
Fall River	George W. Wright	Shove Mills.
Fisherville	Albert W. Dimick	Fisher Mfg. Co.
Fisherville	Charles W. Fisher	Fisher Mfg. Co.
Fiskdale	John Gregson	Fiskdale Mills.
Fiskdale	Frederick J. Quinn	Fiskdale Mills.
Fitchburg	Frederick N. Dillon	D. M. Dillon Steam Boiler Works.
Fitchburg	James C. Eteson	Orswell Mills.
Fitchburg	Arthur N. Hersom	Fitchburgh Duck Mills.
Fitchburg	Ernest L. Hersom	Nockedge Mills.
Fitchburg	George P. Grant, Jr.	Grant Yarn Co.
Fitchburg	W. E. Keach	Grant Yarn Co.
Fitchburg	Arthur H. Lowe	Parkhill Manufg Co.
Fitchburg	David Lowe	Parkhill Manufg. Co.
Fitchburg	William F. Morgan	Fitchburg Duck Mills.
Fitchburg	Thomas C. Sheldon	8 School St.
Fitchburg	Walter F. Stiles	Orswell Mills.
Fitchburg	Ralph E. Thomson	Parkhill Manufg. Co., Mill C.
Griswoldville	Joseph W. Ballard	Griswoldville Mfg. Co
Holyoke	Samuel M. Green	The American Thread Co.
Holyoke	Ernest Lovering	Lyman Mills.
Hopedale	Clare H. Draper	Experimental Dept. Draper Co.
Hopedale	Eben S. Draper	Draper Co.
Hopedale	George A. Draper	Draper Co.
Hopedale	George Otis Draper	Draper Co.
Hopedale	William F. Draper	Draper Co.
Hopedale	Frank J. Dutcher	Draper Co.
Hopedale	Wallace I. Stimpson	The Draper Co.

Housatonic	Jno. H. C. Church	Monument Mills.
Housatonic	Theodore Ellis Ramsdell	Monument Mills.
Hyde Park	Calvin H. Lee	Readville Cotton Mills.
Indian Orchard	William C. Godfrey	Indian Orchard Co.
Indian Orchard	Henry C. Spence	Metallic Drawing Roll Co.
Indian Orchard	James Strang	Metallic Drawing Roll Co.
Indian Orchard	William V. Threlfall	Chapman Valve Mfg. Co.
Indian Orchard	R. W. Wight	Indian Orchard Co.
Lawrence	James W. Ahmuty	Atlantic Cotton Mills.
Lawrence	Joshua D. Armitage	247 Haverhill St.
Lawrence	William A. Barrell	Lawrence Duck Co.
Lawrence	Joseph P. Battles	Joseph Battles Co.
Lawrence	Albert W. Brainard	Box 33.
Lawrence	Eugene E. Burnham	252 Lowell St.
Lawrence	G. B. Emmons	Emmons Loom Harness Co.
Lawrence	William D. Hartshorne	Arlington Mills.
Lawrence	Walter M. Hastings	Arlington Mills.
Lawrence	Fred Lacey	9 Winthrop Ave.
Lawrence	John T. Lord	Pacific Mills.
Lawrence	Alvin S. Lyon	Wood Worsted Mill.
Lawrence	James I. Milliken	Everett Mills.
Lawrence	Walter E. Parker	Pacific Mills.
Lawrence	Robert Redford	Box 28.
Lawrence	Francis H. Silsbee	Pacific Mills.
Lawrence	Walter H. Summersby	Atlantic Cotton Mills.
Lawrence	William D. Twiss	Everett Mills.
Lawrence	William S. Whitney	American Woolen Co.
Leicester	Charles A. Denny	
Linwood	Amos G. Maddox	Linwood Mill.
Lowell	George E. Ames	Lawrence Manufg. Co.
Lowell	Harry Gage Baker	Lowell Machine Shop and Kitson Machine Shop.
Lowell	Charles Ray Blake	Tremont and Suffolk Mills.
Lowell	Norman E. Borden	Lowell Weaving Co.
Lowell	Frank A. Bowen	Appleton Co.
Lowell	Edward N. Burke	Lowell Machine Shop.
Lowell	W. W. Carey	Wood Rim Pulleys and Wood Working Machinery.
Lowell	Alfred M. Chadwick	Tremont and Suffolk Mills.
Lowell	Clarence N. Childs	Hamilton Mfg. Co.
Lowell	Avery B. Clark	Merrimack Mfg. Co.
Lowell	John J. Connell	Tremont and Suffolk Mills.
Lowell	A. G. Cumnock	Appleton Co.
Lowell	Joseph L. Cushing	Daniel Cushing & Co.
Lowell	Albert Deabill	Lowell Hosiery Co.
Lowell	Edward P. Dennis	50 Chelmsford St.
Lowell	John H. Dunn	Tremont & Suffolk Mills.

Lowell	William Ambrose Eastman	Hooper Knitting Co.
Lowell	George Fish	Massachusetts Cotton Mills.
Lowell	John W. Foster	Hamilton Mfg. Co.
Lowell	Royal W. Gates	Josiah Gates & Sons.
Lowell	Percy Gulline	Merrimack Print Works.
Lowell	Walter B. Hall	Hamilton Mfg. Co.
Lowell	William E. Hall	Shaw Stocking Co.
Lowell	Charles C. Hedrick	Lowell Machine Shop.
Lowell	P. T. Jackson, Jr.	Lowell Weaving Co.
Lowell	Nelson D. Keables	Mass. Cotton Mills.
Lowell	Frank B. Kenney	T. C. Entwistle Co.
Lowell	Charles F. Libby	Shaw Stocking Co.
Lowell	Albert H. Morton	Lowell Machine Shop.
Lowell	Oliver H. Moulton	
Lowell	Will Nelson	Lowell Textile School.
Lowell	Franklin Nourse	Lawrence Manufg. Co.
Lowell	Louis Atwell Olney	Lowell Textile School.
Lowell	John W. Pead	1072 Bridge St.
Lowell	Haven C. Perham	Kitson Machine Co.
Lowell	John J. Rooney	Tremont & Suffolk Mills.
Lowell	Frederick P. Shaw	Shaw Machine Co.
Lowell	Stephen E. Smith	Lowell Textile School.
Lowell	William S. Southworth	Mass. Cotton Mills.
Lowell	Berton A. Thissell	Boott Cotton Mills.
Lowell	Earl A. Thissell	Lowell Hosiery Co.
Lowell	Ariel C. Thomas	Boott Cotton Mills.
Lowell	Charles T. Upton	63 Mt. Vernon St.
Lowell	Fenwick Umpleby	Lowell Textile School.
Lowell	Jude C. Wadleigh	Merrimack Mfg. Co.
Lowell	Frederick T. Walsh	Thomas Leyland & Co.
Lowell	Walter S. Watson	Haworth & Watson.
Lowell	Channing Whitaker	Lowell Machine Shop.
Lowell	John K. Whittier	Kitson Machine Shop.
Lynn	John H. Nelson	Wm. Firth Co.
Lynn	Richard H. Rice	Gen. Elec. Co.
Lynn	Henry B. Sprague	Boston Woven Hose and Rubber Co.
Lynn	C. J. H. Woodbury	51 Baltimore St.
Malden	Lewis Dexter Jr.	65 LaCasas St.
Manchaug	T. B. Stevenson	Manchaug Co.
Melrose	George E. Prest	9 Russell St.
Melrose	John E. Prest	9 Russell St.
Methuen	Lewis E. Barnes	Pemberton Co. and Methuen Co.
Methuen	John H. Binns	Arlington Mills.
Methuen	Alfred Sagar	Arlington Cotton Mills.
Millbury	Fred W. Moore	Cordis Mills.
Millbury	Francis H. Rice	Holbrook Mfg. Co.
Nahant	Henry S. Houghton, Jr.	

New Bedford	Charles A. Bowen	S. C. Lowe Supply Co.
New Bedford	Christopher P. Brooks	International Correspondence School
New Bedford	William A. Congdon	Whitman Mills.
New Bedford	Richard Cowell	290 Summer St.
New Bedford	William W. Crapo	Wamsutta Mills.
New Bedford	Mark B. Creed	Wamsutta Mills.
New Bedford	Andrew J. Currier	Kilburn Mills.
New Bedford	Charles Owen Dexter	Beacon Mfg. Co.
New Bedford	John A. Fernley	Butler Mill.
New Bedford	Arnold C. Gardner	Manomet Mills.
New Bedford	William Edwin Hatch	New Bedford Textile School.
New Bedford	Hiram Higham	Wamsutta Mills.
New Bedford	Clark W. Holcomb	Old Colony Mills, Taunton.
New Bedford	Charles M. Holmes	Box 96.
New Bedford	Nathaniel B. Kerr	Butler Mill.
New Bedford	Walter H. Langshaw	Dartmouth Manufg. Corp.
New Bedford	John H. Lawrence	Top Roll Mfg.
New Bedford	Frederick B. Macy	Soule Mills.
New Bedford	John McCullough	Cotton Waste Merchant.
New Bedford	Robert P. McEwen	Lambeth Rope Corp.
New Bedford	John Neild	Grinnell Mfg. Corp.
New Bedford	H. W. Nichols	New Bedford Textile School.
New Bedford	Walter H Paige	Wamsutta Mills.
New Bedford	Albert R. Pierce	Pierce Mfg. Corp.
New Bedford	Andrew G. Pierce, Jr.	Pierce Mfg. Corp.
New Bedford	Frederick W. Reynolds	Potomska Mills.
New Bedford	Lewis T. Shurtleff	Pairpoint Corp.
New Bedford	Rufus A Soule	Soule Mills.
New Bedford	Rufus A. Soule, Jr.	Taber Mill.
New Bedford	William C. Taber	Whitman Mills and Beacon Mfg. Co.
New Bedford	Frederic Taber	Taber Mill.
New Bedford	Samuel Taylor	Soule Mill.
New Bedford	Herbert E. Walmsley	Wamsutta Mills.
New Bedford	Lettice R. Washburn	235 North Water St.
New Bedford	William R. West	830 Purchase St.
New Bedford	Benjamin Wilcox	City Mfg. Co.
New Bedford	Samuel F. Winsper	City Mfg Co.
Newton	Josiah G. Coburn	99 Washington St.
Newtonville	Oscar B. Truesdell	18 Washington Terrace.
Newton Upper Falls	Frank J. Hale	Saco and Pettee Machine Shops.
Newton Upper Falls	R. Paul Snelling	Saco and Pettee Machine Shops.
North Adams	William K. Greer	Eclipse & Beaver Mills.
North Adams	Hervey Burnham	Beaver Mills and Eclipse Mill.
Northbridge	Earl S. Jenckes	Paul Whitin Mfg. Co.
Northbridge	Henry T. Whitin	Paul Whitin Manufg. Co.
Northbridge	Paul Whitin	Paul Whitin Mfg. Co.
North Brookfield	W. Marshall Taylor	Indian Orchard Flax Co.

North Oxford	Edwin N. Bartlett	Edwin Bartlett Co.
North Plymouth	Gideon F. Holmes	Plymouth Cordage Co.
North Uxbridge	Fred B. Whitin	Uxbridge Cotton Mills.
Ponkapoag	Willis S. Shepard	American Net & Twine Co.
Readville	George P. Erhard	The Geo. W. Stafford Co.
Readville	Rowland N. Mackay	The George W. Stafford Co.
Readville	Fred A. Wilde	Geo. W. Stafford Co.
Salem	C. F. Curwen	Dinsmore Mfg. Co.
Salem	William P. McMullan	Naumkeag Steam Cotton Co.
Salem	Henry Osgood	P. O. Box 204.
Salem	Nathaniel G. Simonds	Naumkeag Steam Cotton Co.
Shattuckville	Frank S. Field	Massaemit Yarn Mills.
Somerville	Albert Birch	Birch Bros. Co.
South Boston	Robert Bishop	Robert Bishop Mfg. Co.
South Boston	W. L. Draper	253 A St.
Southbridge	Calvin D. Paige	Central Mills.
South Hadley Falls	Charles W. Dennett	So. Hadley Mills.
South Hadley Falls	Harlan Ingalls Dennett	Hadley Mills.
Springfield	Joseph M. Dunham	43 Edwards St.
Spring Hill	Justin A. Ware	
Taunton	A. C. Bent	Safety Seamless Pocket Co.
Taunton	William H. Bent	Mason Machine Works.
Taunton	Raymond D. Borden	Watuppa Mills.
Taunton	Peter H. Corr	Greenwich Bleachery.
Taunton	Thomas G. Cox	Mason Machine Works.
Taunton	H. H. Culver	Elizabeth Poole Mills.
Taunton	Henry S. Culver	Westville Cotton Mills.
Taunton	S. L. Gabriel	U. S. Linen Co.
Taunton	Henry M. Lovering	Whittenton Manufg. Co.
Taunton	Charles L. Macomber	Winthrop Cotton Yarn Co.
Taunton	John Tempest Meats	Mason Machine Works.
Taunton	Herbert H. Shumway	
Taunton	Henry Williams	Canoe River Mill.
Taunton	Elias S. Willis	N. E. Cotton Yarn Co.
Thorndike	Charles H. Hobbs	Thorndike Co.
Thorndike	Charles A. Tabor	Thorndike Co.
Three Rivers	Roscius C. Newell	Otis Co.
Turners Falls	Samuel L. Parker	Turners Falls Cotton Mills.
Waltham	Charles E. Getchell	Waltham Emery Wheel. Co.
Waltham	Arthur H. Paul	Boston Mfg. Co.
Ware	George E. Tucker	The Otis Co.
Webster	Frank Hartley	S. Slater & Sons.
Webster	E. P. Morton	Stevens Linen Works.
Webster	William J. Stewart	S. Slater & Sons Inc.
Westfield	E. T. Fowler	Foster Machine Co.
Westfield	W. H. Jillson	Mfr. Cotton Yarns.
West Warren	A. G. Harris	West Warren Cotton Mills.

West Warren	George A. Moody	West Warren Cotton Mills.
Whitinsville	Alfred E. Adams	Whitinsville Cotton Mills and Linwood Mills.
Whitinsville	Melvin H. Coffin	Whitin Machine Works.
Whitinsville	Lawrence M. Keeler	Whitin Machine Works.
Whitinsville	Josiah M. Lasell	Whitin Machine Works.
Whitinsville	E. Kent Swift	Whitin Machine Works.
Whitinsville	Oscar L. Owen	Whitin Machine Works.
Whitinsville	Elwin H. Rooney	The Whitin Machine Works.
Whitinsville	Arthur F. Whitin	Saunders Cotton Mills.
Whitinsville	G. Marston Whitin	Whitin Machine Works.
Whitinsville	James Earle Whitin	Uxbridge Cotton Mills.
Williamstown Sta.	Roland R. Kelly	Williamstown Manufg. Co.
Woburn	William W. Crosby	8 Court St.
Worcester	George L. Brownell	Inventor and Builder of Improved Twisting Machinery.
Worcester	George Crompton	Crompton-Thayer Loom Co.
Worcester	Randolph Crompton	Crompton-Thayer Loom Co.
Worcester	Henry F. Harris	W. Boylston Mfg. Co.
Worcester	Lewis T. Houghton	89 Exchange St.
Worcester	A. H. Howard	Howard Bros. Mfg. Co.
Worcester	C. H. Hutchins	Crompton & Knowles Loom Works,
Worcester	Geo. I. Rockwood	62 Summer St.
Worcester	Wm. B. Scofield	Crompton-Thayer Loom Lo.
Worcester	W. W. White	Holyoke Machine Co.

RHODE ISLAND.

Albion	Arnold B. Chace	Valley Falls Co.
Allenton	R. A. Gray	Rodman Manufg. Co.
Anthony	Frank F. Wooley	Coventry Co.
Ashton	Charles H. Collins	Berkeley Co.
Ashton	Robert Stewart	Lonsdale Co.
Bristol	Ezra Dixon	Dixon Lubricating Saddle Co.
Central Falls	Louis B. Barker	United States Cotton Co.
Central Falls	David Grove	United States Cotton Co.
Central Falls,	B. F. G. Linnell,	Yarns, Threads and Twines.
Centreville	James T. Ferguson	Warwick Mills.
Crompton	Charles D. Robinson	Crompton Co.
Drownville	Charles W. Shepard	Rhode Island Lace Works.
East Greenwich	H. M. Peirce	Greenwich Bleachery.
Fiskville	James Gee	Interlaken Dye Works.
Forestdale	William B. Orr	Forestdale Mfg. Co.
Forestdale	Alphonso F. White	Forestdale Mfg. Co.
Georgiaville	A. E. Bosworth	Bernon Mills.
Hamilton	Joseph Warren Greene	Hamilton Web Co.
Longmeadow	Abel T. Atherton	Machine Maker.

Lonsdale	Edward A. Mongeon	Lonsdale Mills.
Lonsdale	R. Irving Tobey	
Manville	A. Tenny White	Manville Co.
Natick	Andrew W. McAllister	
Natick	John G. McFadden	Natick Mills.
Pawtucket	V. T. Barber	Slater Cotton Co.
Pawtucket	Harold C. Barnefield	Hays Textile Co.
Pawtucket	William Washington Blades,	Lorraine Mfg. Co.
Pawtucket	E. R. Bullock	J. & P. Coats, Ltd.
Pawtucket	Robert Burgess	Slater Cotton Co.
Pawtucket	Benjamin C. Chace Jr.	Jenckes Spinning Co.
Pawtucket	William P. Dempsey	Dempsey Bleachery & Dye Works.
Pawtucket	Henry C. Dexter	Greene & Daniels Mfg. Co.
Pawtucket	Fred W. Easton	Easton & Burnham Machine Co.
Pawtucket	D. A. Everly	Cotton Mfr.
Pawtucket	Lyman B. Goff	Union Wadding Co.
Pawtucket	William Halliwell	Ingrahamville Dye Works.
Pawtucket	Charles E. Harrison	Harrison Yarn and Dyeing Co.
Pawtucket	David Jackson	Jackson Pat. Shell Roll Co.
Pawtucket	J. E. Jenckes	The E. Jenckes Manufg. Co.
Pawtucket	Albert A. Jenks	Fales & Jenks Machine Co.
Pawtucket	John T. Kirk	Slater Cotton Co.
Pawtucket	James R. MacColl	Lorraine Manufg. Co.
Pawtucket	Frederick R. Mason	The Robert D. Mason Co.
Pawtucket	Edward J. McCaughey	Home Bleach & Dye Works.
Pawtucket	James C. Potter	Potter & Johnson Co.
Pawtucket	John W. Ramsbottom	
Pawtucket	Charles O. Read	Sayles' Bleacheries, and Glenlyon Dye Works.
Pawtucket	E. R. Richardson	Howard & Bullough American Machine Co., Ltd.
Pawtucket	Israel P. Rounds	Naushon Co.
Pawtucket	Frank A. Sayles	Sayles Bleacheries & Lorraine Mfg. Co.
Pawtucket	Dwight Seabury	12 East Ave.
Pawtucket	Charles S. Smith	Smith Webbing Co.
Pawtucket	W. H. Smith	American Textile Co.
Pawtucket	Jacob Stephans	William H. Haskell Mfg Co.
Pawtucket	Edward Thayer	Lebanon Mill Co.
Pawtucket	S. Willard Thayer	Dexter Yarn Co.
Pawtucket	William P. Wood	Royal Weaving Co.
Peace Dale	William C. Greene	Peace Dale Manufg. Co.
Phenix	Henry R. Brown	Phenix Mill.
Phenix	Robert Reoch	Cranston Print Works Co.
Providence	Charles T. Aldrich	Aldrich Manufg. Co.
Providence	John Ormsbee Ames	Fletcher Mfg. Co.
Providence	William Ames	Fletcher Mfg. Co.

Providence	George R. Babbitt	American Oil Co.
Providence	Edward R. Ballou	Ballou Yarn Co.
Providence	Edward R. Blanchard	Glenlyon Dye Works.
Providence	J. Frank Braids	Charles S. Bush Co.
Providence	H. Martin Brown	U. S. Bobbin & Shuttle Co.
Providence	E. C. Bucklin	Interlaken Mills.
Providence	Harris H. Bucklin	Interlaken Mills.
Providence	Granville R. Budlong	Union Wadding Co.
Providence	Charles H. Child	Standard Mill Supply Co.
Providence	Alfred M. Coats	J. & P. Coats, L't'd.
Providence	Frederick I. Dana	The Textile Machinery Finishing Co.
Providence	A. Lockwood Danielson	Quinebaug Co.
Providence	J. DeForest Danielson	Lockwood Co. and Lewiston Bleachery and Dye Works.
Providence	John W. Danielson	Lockwood Co., Ponemah Mills, Quinebaug Co., Wauregan Co., & Lewiston Bleachery & Dye Works.
Providence	Henry B. Deming	Deming Braiding Co.
Providence	Arthur W. Dennis	Elmwood Mills.
Providence	Jesse P. Eddy, Jr.	Tillinghast Stiles Co. and Fitch Mfg. Co.
Providence	F. C. Fletcher	Lawton Spinning Co.
Providence	J. Herbert Foster	10 South Water St.
Providence	Arthur C. Freeman	Textile Finishing Machinery Co.
Providence	William Gammell	Berkeley Co.
Providence	R. H. I. Goddard, Jr.	Goddard Bros.
Providence	Rufus B. Goff	Standard Mill Supply Co.
Providence	Russell Grinnell	General Fire Extinguisher Co.
Providence	John H. Hambly	Quidnick Mfg. Co.
Providence	A. Walter Harris	A. W. Harris Oil Co.
Providence	Alexander F. Hobbs	U. S. Finishing Co.
Providence	Frederic W. Howe	Crompton & Knowles Loom Works.
Providence	Albert C. Hoy	Grosvenor Dale Co.
Providence	Daniel Jackson	B. B. & R. Knight.
Providence	Albert F. Knight	1149 Elmwood Ave.
Providence	John E. Kendrick	American Supply Co.
Providence	Stephen A. Knight	Hebron Manufg. Co.
Providence	Webster Knight	B. B. & R. Knight's Mills.
Providence	W. C. Langford	14 Peck St.
Providence	Henry F. Lippitt	Social and Manville Cos.
Providence	Charles R. Makepeace	Box 973.
Providence	Henry W. Mason	10 South Water St.
Providence	F. H. Maynard	Gen. Fire Extinguisher Co.
Providence	Thomas Mayor	Thomas Mayor & Son.
Providence	Charles H. Merriman, Jr.	Manville Co.
Providence	William C. Peirce	Elizabeth Mills.
Providence	Stephen Minot Pitman	Narragansett Mutual Fire Ins. Co.

Providence	Charles A. M. Praray	Chas. A. M. Praray & Co.
Providence	E. A. Rusden	17 Exchange Place.
Providence	Robert Schaellibaum	Rob. Schaellibaum Co.
Providence	Frank P. Sheldon	Industrial Trust Building.
Providence	Harry M. Smith	Standard Mill Supply Co.
Providence	Antonio Spencer	Spencer Yarn Co.
Providence	Wilton H. Spencer	7 Exchange Place.
Providence	Daniel J. Sully	T. M. Reynolds & Co.
Providence	Robert W. Taft	Coventry Co.
Providence	Charles F. Taylor	Burgess Cop Tube Co.
Providence	D. M. Thompson	P. O. Box 442.
Providence	James T. Thornton	Thornton Machinery Co.
Providence	H. A. Tillinghast	The Textile Finishing Machinery Co.
Providence	A. Curtis Tingley	National Ring Traveler Co.
Providence	W. O. Todd	Lawton Spinning Co.
Providence	Robert B. Treat	Manufacturers' Fuel Co.
Providence	William P. Vaughan	Putnam Mfg. Co.
Quidnick	Alton L. R. Hambly	Quidnick Mfg. Co.
Quidnick	O. B. Parker	Quidnick Mfg. Co.
Riverpoint	Arthur F. Brackett	Royal Arctic and Valley Queen Mills
Saylesville	Charles F. Burnham	Crefeld Waste and Batting Co., and The L. A. Lockwood Co.
Saylesville	L. A. Lockwood	Crefeld Waste and Batting Co., and The L. A. Lockwood Co.
Valley Falls	Malcolm G. Chace	Naushon Mfg. Co.
Valley Falls	Edward B. Jennings	Samoset Co.
Warren	Henry D. Martin	Parker Mills.
Warren	Arnold Schaer	Warren Manufg. Co.
Westerly	William Clark	Wm. Clark Mills, American Thread Co
Westerly	Robert Dow	Solway Mills.
Westerly	A. E. Henry	Solway Mills.
Westerly	Alexander King, Jr.	Amer. Thread Co.
Westerly	Robert B. Meikle	Lorraine Mfg. Co.
Westerly	Harry Tunstall	American Thread Co.
Woonsocket	L. W. Campbell	Woonsocket Machine and Press Co.
Woonsocket	Malcolm Campbell	Woonsocket Mach. & Press Co.
Woonsocket	Harry S. Greene	Woonsocket Napping Machinery Co.
Woonsocket	Henry S. Greene	Woonsocket Napping Machinery Co.
Woonsocket	William Halliwell	Providence and Woonsocket Mill. of the Lawton Spinning Co.
Woonsocket	Edward W. Houghton	Globe Mill, Manville Co.
Woonsocket	Henry S. Houghton, Sr.	61 Pond St.
Woonsocket	Leonard Johnson	94 Highland St.
Woonsocket	William N. Kimball	Social and Nourse Mills.
Woonsocket	Hadley D. Perkins	Bellingham Handkerchief Mfg. Co.
Woonsocket	Charles E. Thomas	44 Prospect St.
Woonsocket	Marcus J. Woodrow	Clinton Mfg. Co.

CONNECTICUT.

Baltic	Samuel T. Butterworth	Baltic Mills Co.
Baltic	William E. Peck	The Baltic Mills Co.
Danielson	Gordon A. Johnstone	Danielson Cotton Co.
Danielson	Frank Porter Jr.	Danielson Cotton Mill.
Danielson	James Herbert Smith	Quinebaug Co.
Jewett City	Frederick D. Ballou	W. A. Slater Mills.
Jewett City	James O. Sweet	Ashland Cotton Co.
Jewett City	Adelbert R. Young	Ashland Cotton Co.
Killingly	H. C. Atwood	Williamsville Manufg. Co.
Killingly	W. E. Atwood	Williamsville Manufg. Co.
Killingly	Ernest E. Clark	Williamsville Mfg. Co.
Killingly	C. H. Truesdell	Attawaugan Co.
Middletown	Benjamin Forster	384 Main St.
Middletown	Frank B. Gustafson	I. E. Palmer Cotton Spinning Mill.
Middletown	Joseph Merriam	Springfield Webbing Co.
Middletown	J. F. Powers	Spinning Mill.
Middletown	Fred Unger	I. E. Palmer Mills.
Montville	W. G. Hartford.	Monarch Woolen Mills.
Montville	W. S. Trickett	Attawaugan Co.
Moosup	L. B. Cranska	Floyd Cranska Mills.
New Haven	George S. Barnum	The Bigelow Co.
Norwich	W. N. Blackstone	Attawaugan Co. and Totokett Mills Co.
Norwich	W. R. Burnham	362 Main St.
Norwich	C. H. Frisbie	Attawaugan Co. Arista Mills Co.
Norwich	W. G. Henderson	Falls Co.
Norwich	Wm. I. Woodward	Shetucket Co.
Norwich Town	Arthur H. Gulliver	P. O. Box 313.
Plainfield	Harold Lawton	The Lawton Mills Corp.
Putnam	George W. Holt	Monohansett Manufg. Co.
Putnam	George A. Vaughan	Putnam Manufg. Co.
Sterling	Harold Mowry	Br. U. S. Finishing Co.
Taftville	Joseph D. Aiken	Ponemah Mills.
Taftville	John Eccles	Ponemah Mills.
Uncasville	Robert G. McMeehan	Uncasville Mfg. Co.
Versailles	Charles W. Perkins	The Totokett Mfg. Co.
Voluntown	George T. Briggs	The Briggs Mfg. Co.
Waterbury	Archer J. Smith	The American Mills Co.
Wauregan	James A. Atwood	Wauregan Co. & Quinebaug Co.
Wauregan	John Walter Atwood	Wauregan Co.
Willimantic	Dickerson G. Baker	American Thread Co.
Willimantic	E. S. Boss	American Thread Co.
Willimantic	John L. Burton	Willimantic Cotton Mills.
Willimantic	Peter Hardman	American Thread Co., Willimantic Mills.
Willimantic	Walter B. Knight	Windham Mfg. Co.

Willimantic	Joseph Mercer	Willimantic Cotton Mills Co.
Windsor Locks	George M. Montgomery	The J. R. Montgomery Co.
Windsor Locks	J. R. Montgomery	The J. R. Montgomery Co.

NEW YORK.

Brooklyn	Hugh De Haven	De Haven Mfg Co.
Capron	W. H. Cloher, Jr.	Utica Cotton Co.
Chadwicks	Bradford C. Divine	Utica Willowvale Bleaching Co.
Cohoes	David S. Johnston	Harmony Mills.
Cohoes	Henry C. Phillips	Harmony Mills.
Cohoes	William H. Robinson	No. 3 Harmony Mill.
Delhi	Dudley T. Lyall	
Elmira	William H. Bilbrough	Elmira Knitting Mills and Conewawah Spinning Co.
Jamestown	Thomas Henry Smith	Jamestown Cotton Mill.
Newburgh	William J. Hadfield	124 Smith St.
New York City	Robert Franklin Adams	106 Grand St.
New York City	George Arms	Grand Hotel.
New York City	Edwin H. Baker	Bliss, Fabyan & Co.
New York City	D. C. Ball	5 Beekman St.
New York City	Percy H. Brundage	49 Wall St.
New York City	Albert C. Case	5 Nassau St.
New York City	Charles F. Chase	Cling Surface Co.
New York City	J. E. Cheesman	Cheesman Cotton Gin Co.
New York City	C. C. Cowan	27 William St.
New York City	Charles Henry Davis	25 Broad St.
New York City	L. L. Flemming	American Cotton Co.
New York City	E. C. Foerster	415 Broadway.
New York City	William M. Lovering	24 Thomas St.
New York City	Arthur B. Mann	J. H. Martin & Co.
New York City	John R. Mitchell	Mitchell-Bissell Co.
New York City	S. F. B. Morse	Southern Cotton Corporation.
New York City	Fred Moss	495 Broome St.
New York City	Hugh Nelson	Casualty Co. of America.
New York City	Charles H. Newman	Webster Mfg. Co.
New York City	Arthur Parkinson	Arabol Mfg. Co.
New York City	Chas. F. Pray	Cloth Broker.
New York City	Theodore H. Price	Cotton Dealer.
New York City	William N. Shaw	The Lincoln Iron Works & Jackson Architectural Iron Works.
New York City	Clarence Whitman	Wilkesbarre Lace Mfg. Co.
New York City	Arthur Whittam	James E. Mitchell Co.
New York City	George A. Wies	Eureka Fire Hose Co.
New York Mills, Oneida Co.,	J. B. Bolton	New York Mills.
New York Mills, Oneida Co.,	John P. Campbell,	New York Mills.
New York Mills, Oneida Co.,	Lavater W. Powers,	New York Mills.

Oswego	George E. Farrell	Ontario Knitting Co.
Oswego	James G. Merriman, Jr.	Standard Spinning Co.
Perry	Robert A. Copeland	Perry Knitting Co.
Suffern	Stewart F. Carter	Atlantic Fibre Co.
Utica	John W. Allis	Utica Knitting Co.
Utica	George DeForest	Utica Steam and Mohawk Valley Cotton Mills.
Utica	James B. Duggan	41 Jewett Place.
Utica	D. W. Gray	Manager La Tosca Spinning Co.
Utica	Charles Hayes Jr.	Skenandoa Cotton Co.
Utica	Henry F. Mansfield	Utica Steam Cotton Mills and Mohawk Valley Cotton Mills.
Utica	Pardon B. Sanford	Utica Kniting Co.
Utica	Albion K. Searls	Oneita Knitting Mills.
Utica	John B. Wild	Oneita Knitting Mills.
Utica	Rex G. Witherbee	Utica Steam and Mohawk Valley Cotton Mills.

NEW JERSEY.

Atlantic City	Franklin P. Stoy	817 Pacific Ave.
Beverly	Alban Spooner	Beverly Underwear Co.
East Newark	Halsey Connett	Clark Mile End Spool Cotton Co.
East Newark	Adam H. Groel	Clark Mile End Spool Cotton Co.
East Newark	Frank S. Tucker	The Clark Mile End Spool Cotton Co.
Gloucester City	George W. Grove	Argo Mills Co.
Gloucester City	Jesse A. Knight	Argo Mills Co.
Gloucester City	George W. Turner	Argo Mills Co.
Jersey City	Ernest Bridge	Jas. Chadwick & Bro. Ltd.
Jersey City	Maxwell Grierson	Jas. Chadwick & Bro., Ltd.
Jersey City	B. L. Stowe	Eureka Fire Hose Co.
Millville	John F. Reardon	Millville Mfg. Co.
Newark	William H. Loftus	Clark Thread Co.
Newark	Lewis H. Russell	Norfolk St. and Sussex Ave.
New Brunswick	William Henry Hobbs	Johnson & Johnson Co.
Passaic	William L. Lyall	Brighton Mills.
Paterson	J. E. Barbour	Barbour Flax Spinning Co.
Paterson	John W. Ferguson	Paterson Nat. Bank Bldg.
Trenton	Edward C. Stokes	

PENNSYLVANIA.

Chester	William S. Blakeley	Arashapa Co.
Chester	John W. France	The Aberfoyle Mfg. Co.
Chester	W. T. Galey	Aberfoyle Manufg. Co.
Chester	D. Edwin Irving	The Irving & Leiper Manufg. Co.
Chester	Robert F. Kineavy	Jordan Mfg. Co.
Chester	John William Smith	T. I. Birkin & Co.

Chester	D. Irving Trainer	Lincoln Mfg. Co.
Frankford, Phila.	Walter R. Garsed	Wingohocking Cotton Mills.
Mt. Joy	Thomas J. Brown	George Brown's Sons.
North Wales	Maylin Hamburger	Montgomery Mills.
Philadelphia	Bradley C. Algeo	Philadelphia Textile School.
Philadelphia	Robert Beatty	Robt. Beatty & Co.
Philadelphia	Robert Blood	7th and Somerset Sts.
Philadelphia	T. Ashby Blythe	Ashby Cotton Mills.
Philadelphia	Joseph H. Bromley	Fourth and Lehigh Ave.
Philadelphia	Alfred H. Burnham	Glasgow Mills.
Philadelphia	Harry W. Butterworth	H. W. Butterworth & Sons.
Philadelphia	James Butterworth	H. W. Butterworth & Sons.
Philadelphia	E. G. Chester	Cedar and Huntingdon Sts.
Philadelphia	H. M. Daniel	The Mayo Mills and The Avalon Mills.
Philadelphia	Frederick A. Downes	Keystone Mutual Fire Insurance Co.
Philadelphia	Edward W. France	Philadelphia Textile School.
Philadelphia	Simon Friedberger	Friedberger Mfg. Co.
Philadelphia	Otto Goetze	Glasgow Mills, Kensington Station.
Philadelphia	John T. Greenwood	R. Greenwood & Bault.
Philadelphia	Henry S. Grove	Argo Mills Co.
Philadelphia	James Henry	Thomas Henry & Sons.
Philadelphia	William G. Henry	Thomas Henry & Sons.
Philadelphia	Robert P. Hooper	Hooper Sons Mfg. Co.
Philadelphia	W. C. Houston	Hope Mills Mfg. Co.
Philadelphia	John H. Lorimer	Ontario and Lawrence Sts.
Philadelphia	David H. McKinley	Philadelphia Thread Co.
Philadelphia	Simon Miller	16th & Reed Sts.
Philadelphia	David Milne	Washington Ave and 10th & 11th Sts.
Philadelphia	Edward H. Sanborn	Cold Spring Bleach. & Fin. Works.
Philadelphia	Albert E. Schofield	Delph Spinning Co.
Philadelphia	W. A. Spellissy	Dolier & Co., Mariner and Merchants' Building.
Philadelphia	William L. Turner	North American Lace Co.
Philadelphia	Joseph Wasserman	Philadelphia Tapestry Mills.
Philadelphia	William T. Westerman	Ontario Spinning Co.
Philadelphia	James S. Whitaker	William Whitaker & Sons.
Philadelphia	George Wood	Millville Mfg. Co.
Philadelphia	John P. Wood	521 N. 22nd St.
Philadelphia	Oscar W. Wood	Germantown Spinning Co.
South Bethlehem	Frederick Ott	Lehigh Valley Silk Mills.
Yardley	Theodore C. Search	Cold Spring Bleaching and Finishing Works.

DELAWARE.

Wilmington	Daniel Moore Bates	Joseph Bancroft & Sons Co.
Wilmington	John B. Bird	Joseph Bancroft & Sons Co.

MARYLAND.

Baltimore	E. Stanley Gary	Gary Mfg. Co.
Baltimore	James A. Gary	Gary Mfg. Co.
Baltimore	Wm. E. Hooper	Woodberry Division of Mt. Vernon Woodberry Co.
Baltimore	Charles K. Oliver	U. S. Duck Corporation.
Baltimore	E. W. Thomas	Consolidated Cotton Duck Co.
Baltimore	Charles W. Wood	U. S. Cotton Duck Corporation.
Ilchester	Samuel F. Patterson	Thistle Mills Co.

VIRGINIA.

Danville	Harry W. Kimball	Riverside Cot. Mills.
Danville	George W. Robertson	Dan River Cotton Mills.
Emporia	W. T. Tillar	The Ashby Cotton Mill Co., Inc.

NORTH CAROLINA.

Asheville	Henry Rowe	Elk Mountain Bleachery.
Charlotte	Byron F. Card	Charlotte Machine Co.
Charlotte	E. N. Clemence	
Charlotte	Stewart W. Cramer	The Whitin Machine Works and Wooonsocket Machine & Press Co.
Charlotte	Edward T. Garsed	
Charlotte	R. M. Miller, Jr.	Elizabeth Mills.
Charlotte	Daniel A. Tompkins	D. A. Tompkins Co.
Cooleeme	Henry J. Forsyth	Cooleeme Cotton Mill.
Fayetteville	Frank H. Cotton	
Fayetteville	Walter L. Holt	Holt-Morgan Mills.
Greensboro	Caesar Cone	Proximity Mfg. Co.
Greensboro	Farquharson J. Muir	Cone Export & Commission Co.
Lincolnton	R. S. Reinhardt	Elm Grove Cotton Mills.
Lincolnton	James W. Taylor	Wampum Mills.
Mountain Island	W. T. Jordan	Mt. Island Manufg. Co.
Spray	Arthur J. Draper	American Warehouse Co.
Spray	Aaron C. Phelps	German-American Co.
Winston-Salem	John W. Fries	F. & H. Fries. & Arista Mills Co.

SOUTH CAROLINA.

Chester	William G. Nichols	Springstein Mills.
Clemson College	Charles S. Doggett	Clemson College.
Columbia	Wallace L. Ball	Columbia Mills Co.
Columbia	Louis I. Guion	Columbia Mills Co.
Columbia	W. H. Rose	Richland, Granby & Olympia Cotton Mills.

Graniteville	T. H. Rennie	Graniteville Mfg. Co.
Lancaster	Leroy Springs	Lancaster Cotton Mills.
Langley	Arthur T. Smith	Langley Manufg. Co. and Aiken Manufg. Co.
Newberry	Edward B. Wilbur	Mollohon Mfg. Co.
Ware Shoals	W. C. Cobb	Ware Shoals Mfg. Co.
Union	William P. Heineken	Union Mfg. and Power Co.
Union	Hartley L. Lord	Union-Buffalo Mills Co.
Warrenville	William H. Rennie	Supt. Warren Mfg. Co.

GEORGIA.

Atlanta	Harry K. Drew	Fulton Bag and Cotton Mills.
Atlanta	Oscar Elsas	Fulton Bag and Cotton Mills.
Atlanta	Henry E. Fisher	Atlanta Cotton Mills.
Augusta	Thomas Barrett, Jr.	Langley & Aiken Mills.
Augusta	John W. Chafee	The Sibley Mfg. Co.
Augusta	T. I. Hickman	Graniteville Mfg. Co.
Augusta	Peleg A. Rhodes	Cotton Mill Mutual Fire Ins. Co.
Augusta	Joel Smith	1311 Woodlawn Ave.
Augusta	George R. Stearns	Riverside Mills.
Chattahoochee	W. R. B. Whittier	Whittier Mills.
Columbus	Frederick B. Gordon	Columbus Mfg. Co.
Columbus	Charles H. Gorton	Columbus Mfg. Co.
Columbus	Walter Rigby	Bibb Mfg. Co.
Columbus	George W. Towne	Bibb Mfg. Co.
Commerce	Charles M. Sears	Harmony Grove Cotton Mills.
East Point	Edward C. Beach	Gate City Cotton Mills.
Lawrenceville	C. Enos Bean	Lawrenceville Mfg. Co.
Lawrenceville	Albert E. McDonald	Lawrenceville Mfg. Co.
Lindale	Henry P. Meikleham	Mass. Mills in Georgia.
Macon	Henry C. Dresser	Bibb Mfg. Co.
Macon	H. B. Hopson	Bibb Mfg. Co.
Macon	Logan Owen	Bibb Mfg. Co. Mill No. 1.
Macon	Broadus E. Willingham	Willingham Cotton Mills.

TENNESSEE.

Knoxville	William T. Lang	Brookside Mills.
Memphis	William Dresser Edwards	Randolph Bldg.

ILLINOIS.

Rockford	Howard D. Colman	Barber-Colman Co.

MISSISSIPPI.

Agricultural College	William E. Winchester	Mississippi Textile School.
Meridian	John H. Ledyard	Meridian Cotton Mills.
Starkville	J. D. Mallory	John M. Stone Cotton Mill.

LOUISIANA.

New Orleans	S. Odenheimer	Lane Mills.

KENTUCKY.

Henderson	Paul J. Marrs	Henderson Cotton Mills.
Louisville	O. W. Stites	Louisville Cotton Mills Co.
Louisville	Philip S. Tuley	Louisville Cotton Mills Co.

ALABAMA.

Cordova	Scott Maxwell	Indian Head Mills of Ala.
Pell City	James R. Pearce	Pell City Mfg. Co.

WISCONSIN.

St. Croix Falls	Arthur W. Hunking	Stone & Webster.

CANADA.

Province of Ontario.

Cornwall	William V. Boyd	Canadian Col'd Cotton Mllls Co. Ltd.
Cornwall	S. Greenwood	Canadian Colored Cotton Mills Co., Ltd.
Hamilton	George O. Dexter	Canadian Colored Cotton Mills Co., Ltd.
Hamilton	James M. Young	Hamilton Cotton Co.

Province of Quebec.

Montreal	Alfred Hawkesworth	Merchants Cotton Co.
Montreal	Fred Hawkesworth	Merchants Cotton Co.
Montreal	D. K. McLaren	751 Craig St.
Montreal	A. B. Mole	Dominion Cotton Mills Co.
Montreal	W. T. Whitehead	Dominion Textile Co.
Valleyfield	Charles H. Potter	Montreal Cotton Co.
Valleyfield	Louis Simpson	Montreal Cotton Co.
Valleyfield	Lewis J. Young	Montreal Cotton Co.

NEW BRUNSWICK.

St. John	John B. Cudlip	Cornwall and York Cotton Mills Co.
New Brunswick	J. Whidden Graham	Canadian Col'd Cotton Mill Co., Ltd.
New Brunswick	W. H. Macdonald	Canadian Col'd Cotton Mill Co. Ltd

ENGLAND.

Cheshire	William Myers	Lecturer in Textiles.
Huddersfield	John Sykes	English Card Clothing Co.
Matlock, Derbyshire,	John Edward Lawton	American Thread Co.
Oldham	Robert Taylor Jr.	Soho Iron Works.

GERMANY.

Berlin	William F. Parish, Jr.	Vacuum Oil Co.

RUSSIA.

Moscow	Vladimir F. Gnesin	The Great Yaroslavl Mfg. Co.
Moscow	Vladimir Malinin	Prochoroff Three Hill Mfg. Co.

JAPAN.

Hiogo	Hachiro Henry Fukuhara	Sumoto Mill, Kanegafuchi Spinning Co.

RECAPITULATION.

LOCATION OF MEMBERSHIP.

Maine	18
New Hampshire	28
Vermont	1
Massachusetts	414
Rhode Island	148
Connecticut	48
New York	53
New Jersey	18
Pennsylvania	46
Delaware	2
Maryland	7
Virginia	3
North Carolina	18
South Carolina	13
Georgia	23
Tennessee	2
Wisconsin	1
Illinois	1
Mississippi	3
Louisiana	1
Kentucky	3
Alabama	2
Province of Ontario	4
Province of Quebec	8
New Brunswick	3
England	4
Germany	1
Russia	2
Japan	1
	876

IN MEMORIAM.

EDWARD ATKINSON, Ph. D., LL. D.

EDWARD ATKINSON was born at Brookline, Mass., February 10, 1827, and died at Boston, December 11, 1905, closing a life of energetic usefulness which had been applied towards the improvement of existing conditions.

He was the son of a Boston merchant and attended a private school and academy until the age of fifteen years when he entered the counting-room of the Dry Goods Commission House of Reed & Chadwick. Through this source he became identified with textile manufacturing and became treasurer of a number of cotton and woolen mills, and in January, 1878, was elected president of the Boston Manufacturers' Mutual Fire Insurance Company of which he had been a director for many years. He also retained the treasurership which he had held for a number of years. In this position he actively applied himself to the problems of the protection of mill property against fire in which he met with a high degree of success.

He never restricted his labors to a single business occupation but dealt in a public way both as a writer and speaker upon many economic questions which he approached from the standpoint of a man of affairs, and not from that of one whose preparation had been solely academic in its nature.

With the light of added information his opinions were subject to mutations from time to time, but the one question upon which his views appear to have consistently escaped modification was that of the tariff, in which he was a vigorous opponent of those principles of protection which were as tenaciously upheld by his business associates.

He was one of the incorporators of the Massachusetts Institute of Technology but resigned from its Board of Government a few years before his death.

He was honorary member of the Phi Beta Kappa of Harvard College and member of the American Academy of Arts and Sciences, member of the American and International Statistical Associations, of the Cobden Club, and numerous other organizations.

In 1889 Dartmouth College conferred upon him the degree of Doctor of Philosophy, and the same year the University of South Carolina the degree of Doctor of Laws.

In 1889 he was commissioned by President CLEVELAND, whose election he had cordially advocated, to investigate and report upon the status of bimetallism in Europe.

He became a member of this Association April 19, 1871, and contributed a great many papers and also discussions at the meetings, the total number of his contributions being one hundred and sixty-six.

He was possessed of a wonderful fertility of mental resources which enabled him to ascertain facts and present with wonderful clearness any subject to which he devoted his attention.

While it is too early to make any expression of the comparative merits of the wide extent of the work to which he devoted himself it cannot fail to be conceded that his contributions on the standards of money in this connection, his personally causing the veto of a greenback bill which had been passed by both houses of Congress, will receive a very high value and be worthy of the gratitude of following generations which has received the benefits resulting from the establishment of financial values upon a sound basis.

FREDERICK GRINNELL.

FREDERICK GRINNELL was born at New Bedford, Mass., August 14, 1836, and died in his home town, October 21, 1905.

In 1852, after attending the Friends School in New Bedford, he entered the household of his uncle, JOSEPH GRINNELL of New York, where he prepared for Rensselaer Polytechnic Institute in which he completed the four years course in three years, graduating in 1855 at the head of a class of sixty students. After graduation he became connected with the Jersey City Locomotive Works, and later became the mechanical superintendent of the Atlantic and Great Western Railway, in which position he built over one hundred locomotives.

In 1860 he became treasurer and superintendent of the Corliss Steam Engine Works at Providence and five years later returned to the Jersey City Locomotive Works as general manager.

In 1869 he purchased a controlling interest in the Providence Steam and Gas Pipe Company and about eight years later obtained the license to manufacture the Parmelee Automatic Sprinkler, which he improved and exhibited great energy in the introduction of this device.

In 1881 he invented the more sensitive automatic sprinkler which bears his name and the construction of this device included so much that was original in hydraulics as to deserve more than a passing mention.

In all earlier sprinklers, the distribution of the water was effected by forcing it through small holes or perforations in the body of the sprinkler, producing the subdivision of the water by the interposition of obstructions which would confine the water except at these orifices. In the Grinnell sprinkler a stream of water issuing from an orifice half an inch in diameter impinged upon a splash-plate and was deflected laterally and upward as desired according to the contour of the splash-plate.

As a hydraulic principle, this is of higher efficiency than the former method owing to the smaller amount of frictional loss and such a sprinkler will not become clogged by any foreign matter in the water able to pass through an orifice half an inch in diameter. Since the invention of the Grinnell sprinkler all automatic sprinklers are made with a large opening and a splash-plate, and the use of rose-heads has been abandoned for such purposes.

The ring forming the valve-seat at the opening of the sprinkler is placed in the middle of a flexible diaphragm, and presses against the valve of block tin in the middle of a splash-plate with a serrated edge turned upward similar to a crown gear.

This valve is kept closed by a pair of compound levers, of which the second one is secured at the extreme end by fusible solder to the yoke of the sprinker, and the solder-joint reinforced by a small piece of wire in the form of the letter L, which makes a compound joint lying in three planes and of great strength in resistance to the water-pressure on the sprinkler.

A marked peculiarity of this sprinkler is the arrangement of the valve in the middle of a flexible diaphragm, which is so much larger than the valve that any increase of after-pressure exerts a greater force on the diaphragm than on the exposed surface of the valve and therefore an increase of water-pressure tends to render the sprinkler less liable to leakage as long as the valve is held in place by the rigid supports, but when these are removed by the fusion of the soldered joint, the same water-pressure forces the valve open.

In 1892 he combined the business of his sprinkler with that of the manufacturers of leading devices of this character and retained the management of the whole business until his retirement shortly before his death.

Mr. GRINNELL, throughout the wide range of engineering work which occupied his attention at various times through his extended career, exhibited brilliant qualities both as an inventor and constructor, while as an organizer of manufacturing interests he exercised an energy and ability of high order.

His concentration to business affairs was constant, his only recreation being that of yachting, of which he was an enthusiastic adherent.

The measure of his ability to succeed when others failed may be indicated from the fact that while various forms of these devices were known for over a century yet none of his predecessors ever achieved commercial success, and the same may be said of the numerous contemporaries who were attracted to the business by his success.

He was married twice and leaves a family.

He became a member of this Association October 27, 1886, and read before it papers on Perforated Pipe Sprinklers, Automatic Sprinklers, Gas Engines, and Heating of Mills by Overhead Steam Pipes.

GEORGE A. HURD.

GEORGE A. HURD was a native of Rollinsford, N. H., but had resided at Andover nearly all of his life where he was Superintendent of the Cocheco Manufacturing Company until ill health prevented his continuance in the active duties of the position.

He died September 4, 1905, at the age of forty-six years.

He became a member of this Association April 25, 1901.

HERVEY KENT.

HERVEY KENT died at Exeter, N. H., April 17, 1906, aged eighty-eight.

He was born in Alstead, N. H., April 26, 1818, oldest of the five children of Capt. ASA and POLLY (ABEL) KENT. He received a thorough common school education and was a teacher for three years. By the advice of friends he decided to enter the cotton manufacturing business and found employment at Nashua, his first pay being at the rate of fifty cents per day. He applied himself vigorously to mastering the details of the industry and won steady promotion. More advantageous posts were successfully filled at Manchester, Newton, Barre and Lawrence, Mass.; at Great Falls and Pittsfield, N. H., and at Lewiston, Me. In 1862 he came to Exeter as agent and treasurer of the Exeter Manufacturing Company, and this post he filled with much ability until 1895, when he retired from active management to be succeeded by his son, the late GEORGE E.

KENT. He retained the presidency of the corporation, however, until his death.

Mr. KENT was an enthusiastic farmer and for years his herd of dairy cows was one of the finest in Rockingham county. He was a stalwart Republican in politics, but never accepted office. He was a member of Phillips Church and for over thirty years had served it as deacon. He was a Mason.

Mr. KENT married October 14, 1841, ELIZA J. HANSON of Derby, who died nearly a year before him after sixty-four years of married life. Their family consisted of three daughters and one son, the latter, who died in January, 1905, being the last of the children. He was a charter member of the Association, his membership dating from April 20, 1865.

ALBERT G. MARTIN.

ALBERT G. MARTIN was born at Goffstown, N. H., August 30, 1842 and died at Griffin, Georgia, March 7, 1906.

He entered woolen mills in New Hampshire after he left the schools in his native town and in 1875 gave his entire attention to various cotton mills in New Ipswich, New Hampshire; Braintree and North Uxbridge, Massachusetts, to the Superintendency of the Natchez Mississippi Cotton Mill, from which he went to The Exposition Mills at Atlanta; The Flint Mills at Fall River; The Eufala Mills at Alabama until in 1892 when he came to the management of the Kincaid Mills at Griffin, Georgia, of which he was director at the time of his death which was caused by a sudden attack of paralysis.

He married Miss SARAH A. ABBOTT of Andover, Mass., who survives him.

He was a member of a large number of fraternal orders in some of which he had risen to a high rank.

He became a member of this organization April 30, 1884.

BENJAMIN PHIPPS.

BENJAMIN PHIPPS, senior member of the firm of Parker, Wilder & Company, and also Treasurer of the Cocheco Woolen Manufacturing Company, The Phoenix Factory, Union Manufacturing Company, The Stirling Mills of Lowell, and Director in a number of other mills, died May 1, 1906, at the age of eighty-two years.

He was a man of high character, public-spirited and of especially fine judgment as a financier in the engagement of which may be noted that he was a member of the Board of Directors in numerous corporations other than the above named, including the Mutual Fire Insurance Company, The Fourth National Bank of Boston, Home Market Club, and was also Vice President and Treasurer of the National Association of Woolen Manufacturers.

He became a member of this Association September 29, 1898.

PROCEEDINGS.

In accordance with the legal notice, the stated annual meeting of the Association was held in Huntington Hall, of the Massachusetts Institute of Technology, 491 Boylston Street, Boston, Mass., April 25 and 26, 1906. The following 298 members and 118 guests were present.

MEMBERS.

ALFRED E. ADAMS, Whitinsville, Mass.
JOSEPH D. AIKEN, Taftville, Conn.
GEORGE E. AMES, Lowell, Mass.
CHARLES B. AMORY, Boston, Mass.
WILLIAM F. ARTHUR, Nashua, N. H.
HENRY B. ASHTON, Chestnut Hill, Mass.
HENRY ASHWORTH, Fall River, Mass.
E. W. ATKINSON, Boston, Mass.
H. C. ATWOOD, Killingly, Conn.
GEORGE A. AYER, Easthampton, Mass.
NATHANIEL F. AYER, Boston, Mass.
J. W. BAILEY, Fall River, Mass.
HARRY GAGE BAKER, Lowell, Mass.
JOSEPH W. BALLARD, Griswoldville, Mass.
EDWARD R. BALLOU, Providence, R. I.
FREDERICK D. BALLOU, Jewett City, Conn.
LOUIS B. BARKER, Central Falls, R. I.
EDWIN BARNES, Boston, Mass.
LEWIS E. BARNES, Methuen, Mass.
EDWIN N. BARTLETT, North Oxford, Mass.
WILLIAM M. BATT, Fall River, Mass.
JOSEPH P. BATTLES, Lawrence, Mass.
C. ENOS BEAN, Lawrenceville, Ga.
GEORGE W. BEAN, Lewiston, Me.

ROBERT BEATTY, Philadelphia, Pa.
FRANK P. BENNETT, Jr., Boston, Mass.
JOHN H. BINNS, Methuen, Mass.
ALBERT BIRCH, Somerville, Mass.
F. H. BISHOP, Boston, Mass.
WILLIAM WASHINGTON BLADES, Pawtucket, R. I.
CHARLES RAY BLAKE, Lowell, Mass.
JOHN P. BODGE, Fall River, Mass.
NATHANIEL B. BORDEN, Fall River, Mass.
A. E. BOSWORTH, Georgiaville, R. I.
STEPHEN N. BOURNE, Manchester, N. H.
CHARLES A. BOWEN, New Bedford, Mass.
FRANK A. BOWEN, Lowell, Mass.
ARTHUR F. BRACKETT, Riverpoint, R. I.
ARTHUR T. BRADLEE, Boston, Mass.
J. FRANK BRAIDS, Providence, R. I.
HENRY GORDON BRINCKERHOFF, Boston, Mass.
JAMES T. BROADBENT, Fall River, Mass.
CHRISTOPHER P. BROOKS, New Bedford, Mass.
HARRY S. BROWN, Boston, Mass.
H. MARTIN BROWN, Providence, R. I.
HENRY R. BROWN, Phenix, R. I.
E. R. BULLOCK, Pawtucket, R. I.
ROBERT BURGESS, Pawtucket, R. I.
JOHN H. BURGHARDT, Boston, Mass.
CHARLES B. BURLEIGH, Boston, Mass.
EUGENE E. BURNHAM, Lawrence, Mass.
HERVEY BURNHAM, North Adams, Mass.
JOHN L. BURTON, New Bedford, Mass.
HARRY W. BUTTERWORTH, Philadelphia, Pa.
SAMUEL T. BUTTERWORTH, Baltic, Conn.
WILLIAM H. CADWELL, Nashua, N. H.
L. W. CAMPBELL, Woonsocket, R. I.
W. W. CAREY, Lowell, Mass.
CHARLES F. CHASE, New York, N. Y.
CHARLES H. CHILD, Providence, R. I.
CLARENCE N. CHILDS, Lowell, Mass.
ELMER G. CHILDS, Bondsville, Mass.
ERNEST E. CLARK, Killingly, Conn.
MELVIN H. COFFIN, Whitinsville, Mass.
CHARLES H. COLLINS, Ashton, R. I.
HOWARD D. COLMAN, Rockford, Ill.
FRANK B. COMINS, Boston, Mass.
HALSEY CONNETT, East Newark, N. J.

PETER H. CORR, Taunton, Mass.
STUART W. CRAMER, Charlotte, N. C.
WILLIAM W. CROSBY, Woburn, Mass.
JOHN B. CUDLIP, St. John, N. B.
H. H. CULVER, Taunton, Mass.
ANDREW J. CURRIER, New Bedford, Mass.
PHILIP DANA, Westbrook, Me.
DANIEL J. DANKER, Boston, Mass.
CHARLES W. DENNETT, So. Hadley Falls, Mass.
EDWARD P. DENNIS, Lowell, Mass.
JOHN O. DEWOLF, Boston, Mass.
HENRY C. DEXTER, Pawtucket, R. I.
LEWIS DEXTER, Jr., Malden, Mass.
FREDERICK N. DILLON, Fitchburg, Mass.
EZRA DIXON, Bristol, R. I.
CHARLES S. DOGGETT, Clemson College, S. C.
C. E. W. DOW, Boston, Mass.
EBEN S. DRAPER, Hopedale, Mass.
WILLIAM F. DRAPER, Hopedale, Mass.
JOHN H. DUNN, Lowell, Mass.
FRANK J. DUTCHER, Hopedale, Mass.
FRED W. EASTON, Pawtucket, R. I.
JOHN ECCLES, Taftville, Conn.
FREDERICK W. ELY, Greenville, N. H.
G. B. EMMONS, Lawrence, Mass.
JOHN A. FERNLEY, New Bedford, Mass.
FRANK S. FIELD, Shattuckville, Mass.
WILLIAM FIRTH, Boston, Mass.
CHARLES H. FISH, Dover, N. H.
GEORGE FISH, Lowell, Mass.
FREDERICK A. FLATHER, Boston, Mass.
M. F. FOSTER, Milford, N. H.
E. T. FOWLER, Westfield, Mass.
SIMON FRIEDBERGER, Philadelphia, Pa.
H. P. GARLAND, Saco, Me.
WILLIAM H. GARNER, Newmarket, N. H.
ROYAL W. GATES, Lowell, Mass.
JAMES GEE, Fiskville, R. I.
RUFUS B. GOFF, Providence, R. I.
GEORGE P. GRANT, Jr., Fitchburg, Mass.
ARTHUR F. GRAY, Boston, Mass.
R. A. GRAY, Allenton, R. I.
S. HAROLD GREENE, Boston, Mass.
JOHN GREGSON, Fiskdale, Mass.

DAVID GROVE, Central Falls, R. I.
ARTHUR H. GULLIVER, Norwich Town, Conn.
FRANK J. HALE, Newton Upper Falls, Mass.
WALTER B. HALL, Lowell, Mass.
WILLIAM E. HALL, Lowell, Mass.
Z. D. HALL, Adams, Mass.
WILLIAM HALLIWELL, Woonsocket, R. I.
JOHN F. HAMLET, Fall River, Mass.
ALFRED H. HARTLEY, Fall River, Mass.
FRANK HARTLEY, Webster, Mass.
WILLIAM D. HARTSHORNE, Lawrence, Mass.
WALTER M. HASTINGS, Lawrence, Mass.
EDGAR F. HATHAWAY, Boston, Mass.
WILLIAM B. HAWES, Fall River, Mass.
WILLIAM HAYES, Auburn, Me.
W. G. HENDERSON, Norwich, Conn.
ARTHUR N. HERSOM, Fitchburg, Mass.
ERNEST L. HERSOM, Fitchburg, Mass.
CHARLES H. HOBBS, Thorndike, Mass.
FRANKLIN W. HOBBS, Boston, Mass.
CLARK W. HOLCOMB, New Bedford, Mass.
CHARLES M. HOLMES, New Bedford, Mass.
GEORGE W. HOLT, Putnam, Conn.
JOHN H. HOLT, Fall River, Mass.
WILLIAM P. HOLT, Fall River, Mass.
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ROLAND R. KELLY, Williamstown, Sta. Mass.
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NATHANIEL B. KERR, New Bedford, Mass.
JOSEPH C. KING, Boston, Mass.

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STEPHEN A. KNIGHT, Providence, R. I.
WALTER B. KNIGHT, Willimantic, Conn.
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ADELBERT R. YOUNG, Jewett City, Conn.

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EDWARD PORRITT, Leeds, England.
THOMAS C. POWELL, Boston, Mass.
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R. T. ROBINSON, Concord, Mass.
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H. E. STAFFORD, Providence, R. I.
SAMUEL H. STEELE, New York City.
RALPH L. STEVENS, Boston, Mass.
H. J. STINNITX, Boston, Mass.
A. ST. ONGE, Providence, R. I.
J. E. SULLIVAN, Worcester, Mass.
R. I. TABEY, Yardley, Penn.
GAY D. THAYER, Worcester, Mass.
HENRY E. TURNER, Boston, Mass.
WILLIAM A. G. TURNER,
HARRY VLIET, Newark, N. J.
EDWIN NEVILLE VOSE, New York City.
H. W. WADLEIGH, Boston, Mass.
JOHN A. WALKER, Boston, Mass.
GEORGE H. WATERMAN, Boston, Mass.
R. E. WATTLES, Canton, Mass.
P. C. WENTWORTH, Fall River, Mass.
F. W. WESTON, Boston, Mass.
MALCOLM D. WHITMAN, Boston, Mass.
J. D. WHITTAKER, Boston, Mass.
JAMES F. WOOD, Boston, Mass.

FIRST SESSION.

WEDNESDAY MORNING, APRIL 25, 1906.

The Association met in Huntington Hall of the Massachusetts Institute of Technology, and the meeting was called to order at 11 A. M., President JAMES R. MACCOLL in the chair.

The Secretary read the call for the meeting as follows:

BOSTON, MASS., April 2, 1906.

To the Members:

Notice is hereby given that the stated Annual Meeting of this Association will be held at Boston, Mass., Wednesday and Thursday, April 25 and 26, 1906.

The sessions will be held in Huntington Hall of the Massachusetts Institute of Technology, 491 Boylston Street, Boston. The building can be reached by taking the elevated railway to the Park Street Station in the Subway, and changing there to any street car going south.

The sessions will be called to order on Wednesday at 11 A. M., and 2 P. M.; on Thursday at 10 A. M. and 2 P. M.

In compliance with a notice given at the Seventy-ninth Meeting two amendments which have received the approval of the Board of Government will be submitted in accordance with Article 17 of the Constitution and By-Laws:

1. To change the name of this Association to The National Association of Cotton Manufacturers, the following will be offered:

WHEREAS it is desired to change the name of this Association from New England Cotton Manufacturers' Association to The National Association of Cotton Manufacturers', if the approval of the Commissioner of Corporations for the Commonwealth of Massachusetts can be obtained.

NOW, THEREFORE, it is

Voted, To discontinue the name New England Cotton Manufacturers' Association and adopt in place thereof, as the name of this Corporation, the name The National Association of Cotton Manufacturers', and the President and Secretary of this Association are instructed to apply to the Commissioner of Corporations of the Commonwealth of Massachusetts for authority to effect such change of name. Upon such change of name being authorized, the Board of Government is hereby instructed to make such changes in the seal of the corporation, and to take such other action as the change of name may require.

3. Also the following amendment:

ARTICLE 7 of the Constitution and By-laws is hereby amended by striking out the word "six" in line two of said Article 7, and inserting in place thereof the word "nine," so that the section as amended will read as follows: "Article 7, The officers of this Association shall be a President, two Vice-Presidents, nine Directors. a Treasurer, Secretary and Auditor of Accounts."

ARTICLE 8 of the Constitution and By-Laws is hereby amended by striking out the second word "two" in line two of said Article 8, and inserting in place thereof the word "three" and by striking out the word "two" in line 3 of said Article 8, and inserting in place thereof the word "three," and by adding at the end thereof the following:

"But it is further provided that at the next election of Directors, following the adoption of this amendment, in addition to the three directors whose election is already contemplated in this section as amended, and in addition to the filling of any vacancies already provided for under Article 10, there shall also be one director elected for a term of two years, and one for a term of one year, "so that said Article 8 as amended will read as follows:

ARTICLE 8. At each annual meeting there shall be chosen by ballot a President, two Vice-Presidents, and three Directors; the President and Vice-Presidents to serve one year, and the three Directors shall be chosen for terms of three years, unless sooner removed as hereinafter provided. But it is further provided that at the next election of Directors, following the adoption of this amendment, in addition to the three Directors whose election is already contemplated in this section as amended, and in addition to the filling of any vacancies already provided for under Article 10, there shall be also one Director elected for a term of two years, and one for a term of one year.

The bills for dues for the fiscal year beginning April 1, 1906, are enclosed herewith.

By order of the Board of Government.

Respectfully submitted,

C. J. H. WOODBURY,
Secretary.

HIS HONOR EBEN S. DRAPER, Lieutenant Governor of the Commonwealth of Massachusetts will welcome the Association on behalf of the State.

HON. JAMES WILSON, Secretary of Agriculture, Washington; H. W. MACALISTER, ESQ., representing the International Federation of Master Cotton Spinners and Manufacturers' Associations, Manchester, England; FREDERICK P. FISH, ESQ., President of The American Telephone and Telegraph Company, and HENRY SMITH PRITCHETT, LL. D., President Massachusetts Institute of Technology will address the Association.

The Bureau of Manufactures of the Department of Commerce and Labor, Washington, will contribute to the meeting a large number of samples of cotton goods and yarns sold in the Chinese markets.

The full programme will not be issued until the meeting, but papers are expected on the following subjects, and advance copies of any papers which are printed in time will be sent to the members on request.

Belt Creep.
Cost of Raising Cotton.
Cotton Prices and Wool Prices.
Mechanical Stokers.
Objects of the International Federation of Master Cotton Spinners and Manufacturers' Association.
Reinforced Concrete Applied to Factory Construction.
Reminiscenses of Seventy-One Years in the Cotton Spinning Industry.
Some Export Trade Humbugs and Fallacies.
The Influence of Humidity, Temperature and Lubrication Upon the Power of Textile Mills.
Weights and Measures Applied to Textile Numbering.
Wider Markets for American Goods.

The Committee on Meeting, wearing white rosettes, consists of CHARLES T. PLUNKETT, Chairman; E. W. ATKINSON, NATHANIEL F. AYER, DANIEL J. DANKER, JOHN O. DEWOLF, EDWIN FARNHAM GREENE, GEORGE B. MORISON, and FRANKLIN D. WILLIAMS, who will take charge of the sessions.

Two adjoining rooms are reserved for the use of the members, in one of which smoking is permitted.

Hotel Brunswick opposite the Institute of Technology will serve a special lunch in a dining room reserved from 12.30 until 2.30 for those attending the meetings. Tickets to be obtained at the hotel desk.

The souvenir badges will be given to those members who are in attendance, and the Board of Government has given instructions that duplicates shall not be given until after the adjournment, but other souvenir badges will be given to the guests of members.

A blank proposition for membership is enclosed for convenience in submitting the names of any who would be desirable members. Many persons have not become members because they have not been invited. Candidates for membership will receive the same privileges as the members. Blank propositions are also inside the front cover of the Transactions, or will be sent on application.

Members who have overlooked their postal card receipts for Transactions are requested to give the matter attention, as it is only through this means that the headquarters of the Association are able to know that members receive the volumes and notices to which they are entitled, and to keep an accurate record for sending Transactions and notices to members.

It is important that the Association should be promptly informed of changes of address of any members, in order that they may promptly receive their copies of Transactions.

The SECRETARY. Mr. President, I certify that in accordance with article 16 of the constitution and by-laws a copy of the call has been mailed to each member at least ten days before this meeting and furthermore, I certify that a quorum is now present prepared to lawfully do any business which properly comes before this organization.

The program of the meeting was as follows:

PROGRAMME.

First Session, Wednesday, April 25, 1906, at 11 A. M.

Call to Order.

Business.

Reports of Secretary and Treasurer.

Award of the Association Medal.

CHARLES H. FISH, *Chairman*, Dover, N. H.

Capitalizing Brains.

HENRY SMITH PRITCHETT, LL. D., President Massachusetts Institute of Technology, Boston, Mass.

Welcome to the Commonwealth.

His Honor, EBEN S. DRAPER, Lieutenant-Governor of Massachusetts, Hopedale, Mass.

President's Address.

JAMES R. MACCOLL, Providence, R. I.

The Unity of Business Purpose.

FREDERICK P. FISH, Esq., Boston, Mass.

The Influence of Humidity, Temperature and Lubrication Upon the Power of Textile Mills.

WILLIAM F. PARISH, Jr., 7 Reichstagsufer 16. Berlin N. W. Germany.

Some Export Trade Humbugs and Fallacies.

EDWIN NEVILLE VOSE, 290 Broadway, New York City.

Propositions for membership should be in the hands of the Secretary on Wednesday.

After the adjournment of the session those members and guests who care to join a party to be photographed in a group will please assemble on the front steps of the Institute where a photographer will be ready to take the picture without delay.

Hotel Brunswick opposite the Institute of Technology will serve a special lunch in a dining room reserved from 12.30 until 2.30 for those attending the meetings. Tickets to be obtained at the hotel desk.

Second Session, Wednesday, April 25, 1906, at 2 P. M.

Business.

Objects of the International Federation of Master Cotton Spinners and Manufacturers' Association.

H. W. MACALISTER, 33 York Street, Manchester, England.

Reminisences of Seventy-one Years in the Cotton Spinning Industry.

STEPHEN A. KNIGHT, Providence, R. I.

Cost of Raising Cotton.
EBEN C. WILLEY, Fall River, Mass.

Wider Markets for American Goods.
C. A. GREEN, 290 Broadway, New York City.

Cotton Prices and Wool Prices.
FRANK P. BENNETT Jr., Boston, Mass.

Third Session, Thursday, April 26, 1906, at 10 A. M.

Election of Members.

Weights and Measures Applied to Textile Numbering.
GEORGE MOORES, F. S. S., 25 Victoria Street, London, S. W., England.

Reinforced Concrete Applied to Factory Construction.
ROBERT A. CUMMINGS, Pittsburg, Pa.

Election of Officers.

Belt Creep.
W. W. BIRD, Worcester, Mass.

Mechanical Stokers.
ELWOOD E. TAYLOR, Boston, Mass.

The Committee on Meeting, wearing white rosettes, consists of CHARLES T. PLUNKETT, Chairman; E. W. ATKINSON, NATHANIEL F. AYER, DANIEL J. DANKER, JOHN O. DEWOLF, EDWIN FARNHAM GREENE, GEORGE B. MORISON, and FRANKLIN D. WILLIAMS, who will take charge of the sessions.

THURSDAY EVENING, APRIL 26, 1906, AT 6 P. M.,

The Association will give a dinner in honor of the members of the Lancashire Private Cotton Investigation Commission at Hotel Brunswick, on Thursday, April 26, at 6 P. M. for 6.30 P. M.

Members can obtain tickets for themselves and their guests before ten o'clock on Thursday, April 26, at four dollars each on application in person or by mail to Hotel Brunswick, Boylston, corner Clarendon street, Boston, Mass.

The seats will be numbered and reservations will be made by Hotel Brunswick in the order of application, which can be made at any time.

Candidates for membership can obtain tickets the same as members, but tickets for non-members must be obtained on their behalf by members of whom they are personal guests.

Complimentary Telephone service will be furnished to the members of the New England Cotton Manufacturers' Association by the courtesy of the New England Telephone and Telegraph Company and of the American Telephone and Telegraph Company.

Two telephone booths will be placed in the vestibule to Huntington Hall on the second story at the left of the top of the stairs.

This free service is available for local use throughout the Metropolitan district during the day and for toll or for long distance lines before 10 A. M. and after 4 P. M. until 6 P. M., to members as identified by their badges.

Non-members can obtain telephone service at these booths on payment of the regular tariff rates.

A limited number of tickets, each admitting the bearer with friends, including ladies, to the Seventy-fourth Exhibition of Paintings at the Boston Art Club, corner of Dartmouth and Newbury streets, open from 9 A. M. to 10 P. M., may be obtained of the Secretary.

The Boston Museum of Fine Arts invites the members to examine their collection of Textiles at any time between 9 A. M. and 1 P. M., or between 2 P. M. and 5 P. M., on either day of the meeting. In addition to the tapestries, rugs, velvet and silks exhibited in the Textile Gallery on the second floor, a large collection of rare textiles may be seen in room 14 in the basement of the building.

Members will be admitted free on exhibition of badge and others will pay the usual entrance fee of twenty-five cents.

The PRESIDENT. The Secretary will please read the records of the last meeting.

The Secretary read the records of the meeting held at The Chalfonte, Atlantic City, New Jersey, September 21-22, 1905, reported in Volume 79 of the Transactions, and on motion the same were approved.

ELECTION OF OFFICERS.

The PRESIDENT. The Secretary will please give information upon any vacancies in office.

The SECRETARY. Mr. President, the following offices expire by limitation at the close of this meeting:

PRESIDENT.

JAMES R. MACCOLL.

VICE-PRESIDENTS.

WILLIAM D. HARTSHORNE.
GEORGE A. AYER,

DIRECTORS.

GEORGE P. GRANT, JR.,
PHILIP A. MATHEWSON.

Mr. CHARLES H. FISH. Mr. President, I move that a committee on nominations be appointed by the President.

The motion was seconded and carried, and the President appointed as such committee, Messrs. CHARLES H. FISH, ROBERT BURGESS, JOSEPH D. AIKEN and ROBERT MCARTHUR.

CHANGE OF NAME OF ASSOCIATION.

The PRESIDENT. The first business to come before the meeting is the proposed change of the name of the Association of which notice was given at the last meeting. Ballots are prepared and will be distributed by the following committee: Messrs. GEORGE P. GRANT, Jr., CHARLES A. MAKEPEACE and EARL A. THISSELL.

Mr. JOHN ECCLES. Mr. President, I move the adoption of the preamble and resolution to change the name of the Association as stated on the following ballot.

BALLOT FOR CHANGING THE NAME OF THE NEW ENGLAND COTTON MANUFACTURERS' ASSOCIATION TO THE NATIONAL ASSOCIATION OF COTTON MANUFACTURERS.

BOSTON, MASS., April 25–26, 1906.

In compliance with a notice given at the Seventy-ninth Meeting the following amendment which has received the approval of the Board of Government is hereby submitted in accordance with Article 17 of the Constitution and By-Laws:

WHEREAS it is desired to change the name of this Association from New England Cotton Manufacturers' Association to The National Association of Cotton Manufacturers, if the approval of the Commissioner of Corporations for the Commonwealth of Massachusetts can be obtained.

NOW, THEREFORE, it is

Voted, To discontinue the name New England Cotton Manufacturers' Association and adopt in place thereof, as the name of this Corporation, the name The National Association of Cotton Manufacturers, and the President and Secretary of this Association are instructed to apply to the Commissioner of Corporations of the Commonwealth of Massachusetts for authority to effect such change of name. Upon such change of name being authorized, the Board of Government is hereby instructed to make such changes in the seal of the corporation, and to take such other action as the change of name may require.

Shall the forthgoing amendment be adopted?

Write, Yes, or No. .....

Name of Member Voting, ...

The motion was seconded by Mr. CHARLES H. SMITH.

The PRESIDENT. The Committee will please distribute the ballots.

The SECRETARY. Mr. President, may I ask the gentlemen to write their names on these ballots, and "Yes," or "No."

Mr. ARNOLD B. SANFORD. Mr. President, I should like to ask if this proposed change meets the approval of the officers of the Association?

The SECRETARY. It does unanimously.

Mr. ARNOLD B. SANFORD. They are all in favor?

The SECRETARY. Yes, sir. While the ballots are being distributed, may I ask each member at some time during the meeting to register at the desk for members in the entry and obtain a member's badge. The guests will please register at the other table and obtain a guest badge.

Members having to use the telephone will find telephones which have been placed at the service of the Association at the end of the entry. The members' badge is necessary to obtain the courtesy.

Mr. STEPHEN A. KNIGHT. Mr. President, before the motion is put to vote, perhaps I am alone, but I want to enter my protest. A few years ago this same subject came before the Association, and we voted it down. I myself feel very strongly inclined to maintain the old name, "New England Cotton Manufacturers' Association." I think we shall very largely lose our identity when we change our name. Personally, I am very anxious that the name should remain.

Mr. WILLIAM D. HARTSHORNE. Mr. President, I have the highest respect for our friend Mr. KNIGHT'S opinion, but at the same time it seems to me as it did when the matter was under consideration before, that the time to change the name of this Association to a broader one had arrived then, and is more emphatically here today. Some have objected because of the fact that we did not get exactly the name we wanted in the first place. However, there is to my mind no sufficient reason

why we should not adopt the name which is now recommended, and which was proposed by Mr. ROBERT BEATTY, a member from Philadelphia at our meeting in Atlantic City; it was not proposed then by the Board of Government, but has met with their full endorsement. We have, it is true, a National Association of Manufacturers, and some have said that it would be a confusion of names to call this "The National Association of Cotton Manufacturers." But we have also a National Association of Wool Manufacturers and there is no more confusion in the one case than in the other. The name is eminently appropriate, and these are times of national interpendence, if not of independence, and it is incumbent upon us, it seems to me, to strike while the iron is hot and carry forward in a more expanded way the good work which we have already begun.

The PRESIDENT. Are there any other remarks on the motion to change the name of the Association? (No response). Have all voted who desire to vote on the amendment to the constitution? I will therefore declare the polls closed.

The tellers proceeded to the discharge of their duty, collecting the ballots and later submitted the following report:

Vote on changing the name of New England Cotton Manufacturers' Association, to The National Association of Cotton Manufacturers.

Whole number of ballots,	84
Necessary for a choice,	56
Voting in the negative,	20
Voting in the affirmative,	64

GEORGE P. GRANT, JR.,
CHARLES R. MAKEPEACE,
EARL A. THISSELL,
Committee.

The PRESIDENT: I declare the amendment adopted.

There is another amendment to the constitution. I will ask the Secretary to state the nature of it.

The SECRETARY. In order to make the Board of Directors more fully representative in view of the broadening of the scope of the Association, notice of an amendment was made at the last meeting to increase the number from six to nine, as stated in the following ballot:

BALLOT FOR AMENDMENT TO THE CONSTITUTION AND BY-LAWS INCREASING THE NUMBER OF DIRECTORS FROM SIX TO NINE.

BOSTON, MASS., April 25–26, 1906.

In compliance with a notice given at the Seventy-ninth Meeting, the following amendment which has received the approval of the Board of Government is submitted in accordance with Article 17 of the Constitution and By-Laws:

ARTICLE 7 of the Constitution and By-laws is hereby amended by striking out the word "six" in line two of said Article 7, and inserting in place thereof the word "nine," so that the section as amended will read as follows: "Article 7, The officers of this Association shall be a President, two vice-Presidents, nine Directors, a Treasurer, Secretary and Auditor of Accounts."

ARTICLE 8 of the Constitution and By-Laws is hereby amended by striking out the second word "two" in line two of said Article 8, and inserting in place thereof the word "three" and by striking out the word "two" in line 3 of said Article 8, and inserting in place thereof the word "three," and by adding at the end thereof the following: "But it is further provided that at the next election of Directors, following the adoption of this amendment, in addition to the three directors whose early election is already contemplated in this section as amended, and in addition to the filling of any vacancies already provided for under Article 10, there shall also be one director elected for a term of two years, and one for a term of one year, "so that said Article 8 as amended will read as follows:

ARTICLE 8. At each annual meeting there shall be chosen by ballot a President, two Vice-Presidents, and three Directors; the President and Vice-Presidents to serve one year, and the three Directors shall be chosen for terms of three years, unless sooner removed as hereinafter provided. But it is further provided that at the next election of Directors, following the adoption of this Amendment, in addition to the three Directors whose election is already contemplated in this section as amended, and in addition to the filling of any vacancies already provided for under Article 10, there shall be also one Director elected for a term of two years, and one for a term of one year.

Shall the forthgoing amendment be adopted?

Write Yes or No. .....

Name of Member Voting, ...

The PRESIDENT. I will ask the same committee to distribute the ballots.

The committee proceeded to the discharge of their duty, distributing the ballots.

The PRESIDENT. Have all voted who wish? If so, I declare the polls closed.

The committee later submitted their report.

Vote on increasing the number of Directors from six to nine.

Whole number of ballots,	45
Necessary for a choice,	30
Voting in the affirmative,	45
Voting in the negative,	none.

GEORGE P. GRANT, JR.,
CHARLES R. MAKEPEACE,
EARL A. THISSELL.

The PRESIDENT. I declare the amendment adopted. I will ask the Secretary in the meantime to read his report for the year.

THE SECRETARY'S REPORT.

The past year has been one of great moment of the Association which has been the natural result of increase in members and also the extension of the field of service which this organization is now able to perform for the interests of its members.

The Board of Government have held seven meetings and kept closely in touch with the varied matters pertaining to the Association which came up for their consideration.

This is really the fifty-second anniversary of this Association, because it was first the Hampden County Cotton Spinners Association, organized in 1854. It outgrew that locality and that name and in 1864, became the New England Cotton Manufacturers' Association. Fifty-two years ago the first association of cotton manufacturers probably in the world was formed.

ASSOCIATION MEDAL.

The fourth Association medal last year was awarded to HENRY G. KITTREDGE for his paper on The Economic Extension of Cotton Cultivation in the Transactions of the Association, volume 77, page 121, the committee of award being Messrs. STEPHEN A. KNIGHT, WALTER E. PARKER, ROBERT MCARTHUR and D. M. THOMPSON.

The Board of Government appointed Messrs. CHARLES H. FISH, SIDNEY B. PAINE, and WALTER E. PARKER a committee as the Committee on Medal for the present meeting at which the decision will be made public by them.

THE STUDENT'S MEDAL.

The student's medal has been awarded to the following mem-

bers of graduating classes of textile schools designated by the Board of Government, the awards in each case being made to the pupil of the highest rank as determined by committees of members of the Association:

REX GOULD WETHERBEE, Utica, N. Y., a graduate of the New Bedford Textile School.

HENRY SHAW ADAMS, Haverhill, Mass., a graduate of the Lowell Textile School.

EDWARD HENLEY BUSSEY, Cuthbert, Georgia, a graduate of the Georgia School of Technology.

EDWARD GORDON MCIVER, Gulf, North Carolina, a graduate of the Philadelphia Textile School.

The WILLIAM FIRTH Scholarship at the New Bedford Textile School was awarded to WILLIAM G. BLAIR, JR., Whitinsville, Mass.

LIFE MEMBERSHIP.

The amendment to the Constitution providing for life membership still continues to commend itself to the members.

During the last fiscal year the following have qualified for life membership by paying one hundred dollars:

JOHN ORMSBEE AMES, WILLIAM AMES, AUGUSTUS T. CLARK, WILLIAM D. HARTSHORNE, JAMES R. MACCOLL and JOHN R. MITCHELL.

AMENDMENTS TO THE CONSTITUTION.

The Board of Government in view of the wider distribution of membership and the broader functions of this organization have approved of a proposition to change the name of the Association as expressed in the following amendment to be submitted at this meeting.

WHEREAS it is desired to change the name of this Association from the New England Cotton Manufacturerers' Association to The National Association of Cotton Manufacturers, if the approval of the Commissioner of Corporations for the Commonwealth of Massachusetts can be obtained.

NOW, THEREFORE, it is

Voted, To discontinue the name New England Cotton Manufacturers' Association and adopt in place thereof, as the name of this Corporation, the name The National Association of Cotton Manufacturers, and the President and Secretary of this Association are instructed to apply to the Commissioner of Corporations of the Commonwealth of Massachusetts for authority to effect such change of name. Upon such change of name being authorized, the Board of Government is hereby instructed to make such changes in the seal of the corporation, and to take such other action as the change of name may require.

The present and prospective growth in the membership also appears to warrant an increase in the number of directors, in order to more fully represent the membership in the management of the affairs of the Association, and the following amendment will be presented for the purpose.

ARTICLE 7 of the Constitution and By-laws is hereby amended by striking out the word "six" in line two of said Article 7, and inserting in place thereof the word "nine" so that the section as amended will read as follows: "Article 7, The officers of this Association shall be a President, two Vice-Presidents, nine Directors, a Treasurer, Secretary and Auditor of Accounts."

ARTICLE 8 of the Constitution and By-Laws is hereby amended by striking out the second word "two" in line two of said Article 8, and inserting in place thereof the word "three" and by striking out the word "two" in line 3 of said Article 8, and inserting in place thereof the word "three," and by adding at the end thereof lhe following: "But it is further provided that at the next election of Directors, following the adoption of this amendment, in addition to the three directors whose election is already contemplated in this section as amended, and in addition to the filling of any vacancies already provided for under Article 10, there shall also be one director elected for a term of two years, and one for a term of one year, "so that said Article 8 as amended will read as follows:

ARTICLE 8. At each annual meeting there shall be chosen by ballot a President, two Vice-Presidents, and three Directors; the President and Vice-Presidents to serve one year, and the three Directors shall be chosen for terms of three years, unless sooner removed as hereinafter

provided. But it is further provided that at the next election of Directors, following the adoption of this amendment, in addition to the three Directors whose election is already contemplated in this section as amended, and in addition to the filling of any vacancies already provided for under Article 10, there shall be also one Director elected for a term of two years, and one for a term of one year.

MEMBERSHIP.

During the year, the following members have died:

EDWARD ATKINSON, FREDERICK GRINNELL, ERNEST L. HILL, GEORGE A. HURD, ALBERT G. MARTIN and HERVEY KENT, biographical sketches of whom will appear in the volume of Transactions for this meeting.

At the beginning of the fiscal year, the total membership was 755 which has been increased by the election of 107 at the two meetings. This number has been diminished by 37 resignations and five deaths, nineteen dropped for non-payment of dues and two who failed to confirm their elections leaving the net membership 800 in advance of this meeting. This number will be materially increased by the election of candidates for this meeting.

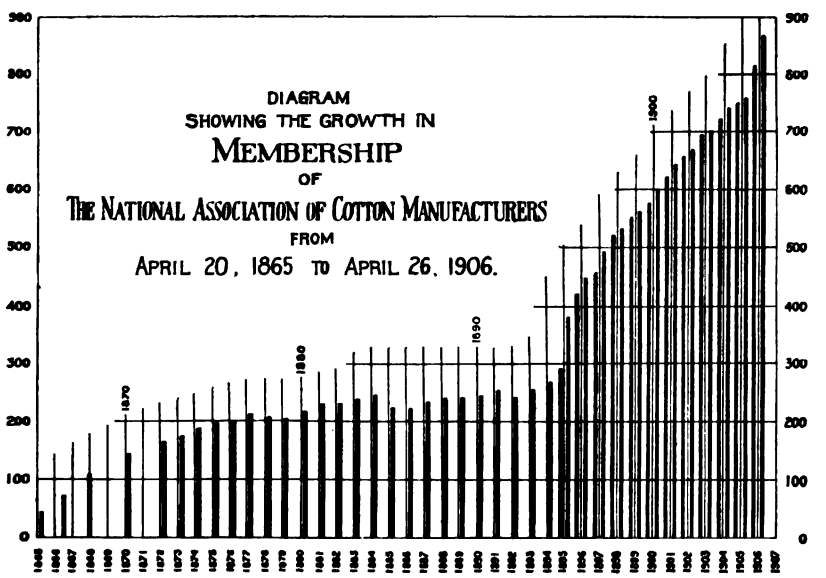
The following table shows the membership of the Association at various meetings since its foundation in April, 1865, the number elected and the number of present members:

MEMBERSHIP OF THE ASSOCIATION.

Number of Meeting.	DATE OF MEETING.	Membership.	Number of Present Members	Number Elected to Membership.
1	Apr. 20, 1865, Boston, Mass.	44	5	44
	July 19, 1865, Adj. Meeting,	—	3	42
2	July 18, 1866, Boston, Mass.	72	0	0
3	July 17, 1867, " "	—	1	10
4	Jan. 15, 1868, " "	108	0	32
5	July 15, 1868, " "	—	1	12
	Oct. 21, 1868, Adj. Meeting,	—	2	6
6	Apr. 21, 1869, Boston, Mass.	—	0	19
7	Oct. 20, 1869, " "	—	1	8
8	Apr. 20, 1870, " "	144	0	12
9	Oct. 19, 1870, " "	—	0	5
10	Apr. 19, 1871, " "	—	0	9
11	Oct. 18, 1871, " "	—	1	16
12	Apr. 17, 1872, " "	166	5	29
13	Oct. 16, 1872, " "	—	2	14
14	Apr. 16, 1873, " "	175	1	13
15	Oct. 15, 1873, " "	—	4	17
16	Apr. 15, 1874, " "	189	1	13
17	Oct. 21, 1874, " "	—	0	7
18	Apr. 21, 1875, " "	199	1	13
19	Oct. 27, 1875, " "	—	2	18
20	Apr. 26, 1876, " "	200	1	11
21	Oct. 25, 1876, " "	—	1	13
22	Apr. 25, 1877, " "	213	3	20
23	Oct. 31, 1877, " "	—	2	9
24	Apr. 24, 1878, " "	210	4	8
25	Oct. 30, 1878, " "	—	1	11
26	Apr. 30, 1879, " "	205	3	10
27	Oct. 29, 1879, " "	—	5	16
28	Apr. 28, 1880, " "	219	2	14
29	Oct. 27, 1880, " "	—	3	13
30	Apr. 27, 1881, " "	231	1	11
31	Nov. 30, 1881, " "	—	1	6
32	Apr. 26, 1882, " "	231	2	9
33	Oct. 25, 1882, " "	—	2	5
34	Apr. 25, 1883, " "	240	4	15
35	Oct. 31, 1883, " "	—	2	10
36	Apr. 30, 1884, " "	247	3	9
37	Oct. 29, 1884, " "	—	2	2
38	Apr. 29, 1885, " "	225	1	3
39	Oct. 28, 1885, " "	—	7	8
40	Apr. 28, 1886, " "	225	4	7
41	Oct. 27, 1886, " "	—	5	8

Number of Meeting.	DATE OF MEETING.	Membership.	Number of Present Members	Number Elected to Membership.
42	Apr. 27, 1887, Boston, Mass.	234	4	10
43	Oct. 27, 1887, " "	——	2	3
44	Apr. 25, 1888, " "	241	10	15
45	Oct. 31, 1888, " "	——	6	12
46	Apr. 24, 1889, " "	242	3	6
47	Oct. 30, 1889, " "	——	5	8
48	Apr. 30, 1890, " "	246	3	7
49	Oct. 29, 1890, " "	——	7	11
50	Apr. 29, 1891, " "	254	3	4
51	Oct. 28, 1891, " "	——	4	8
52	Apr. 27, 1892, " "	244	9	12
53	Oct. 26, 1892, " "	——	13	19
54	Apr. 26, 1893, " "	259	4	11
55	Oct. 25, 1893, " "	——	6	9
56	Apr. 25, 1894, " "	270	11	16
57	Sept. 27—28, 1894, Crawford House, N. H.	292	13	19
58	Apr. 24—25, 1895, Providence, R. I.	383	57	92
59	Oct. 24—25, 1895, Atlanta, Ga.	422	32	46
60	Apr. 29—30, 1896, Boston, Mass.	450	18	29
61	Sept. 22—24, 1896, Profile House, N. H.	459	15	19
62	Apr. 28—29, 1897, Boston, Mass.	495	29	43
63	Oct. 27—28, 1897, Philadelphia, Pa.	523	24	38
64	Apr. 27—28, 1898, Boston, Mass.	535	17	24
65	Sept. 27—29, 1898, Crawford House, N. H.	554	8	16
66	Apr. 26—27, 1899, Boston, Mass.	504	25	33
67	Oct. 5— 6, 1899, Montreal, P. Q.	580	13	22
68	Apr. 25—26, 1900, Boston, Mass.	603	27	38
69	Oct. 16—18, 1900, Washington, D. C.	628	26	38
70	Apr. 24—25, 1901, Boston, Mass.	647	29	33
71	Sept. 25—26, 1901, Niagara Falls, N. Y.	661	15	19
72	Apr. 23—24, 1902, Boston, Mass.	681	35	42
73	Sept. 30—Oct. 2, 1902, New York, N. Y.	699	18	24
74	Apr. 22—23, 1903, Boston, Mass.	706	36	41
75	Sept. 29—Oct 1, 1903, Lenox, Mass.	723	24	27
76	Apr. 27—28, 1904, Boston, Mass.	744	33	41
77	Sept. 21–22, 1904, Bretton Woods, N. H.	761	23	25
78	Apr. 26–27, 1905, Boston, Mass.	755	36	36
79	Sept. 20–21, 1905, Atlantic City, N. J.	820	71	71
80	April, 25–26, 1906, Boston, Mass.	876	79	79

The growth of the Association is shown by the following diagram which illustrates the number of members at each date of which there is a record by the relative height of the broad vertical lines.



The headquarters of the Association have been well patronized by members during the year and the bound volumes of the Transactions and also the books of reference and technical papers have been frequently consulted by those without the Association as well as by its members. The rooms have been called into frequent use by members for various business conferences during the year.

As the office copies of the Transactions of the Association were destroyed by fire February 2, 1890, there is a demand for copies earlier than that date, particularly on the part of the libraries of technical institutions, and the Secretary would like information of any earlier copies which may be for sale.

There is one complete set on sale of which further particulars may be obtained of the Secretary.

The Transactions of the following societies and periodicals are sent to the Association and kept on file.

Transactions of Technical Societies.

American Cotton Manufacturers' Ass'n,	Charlotte, N. C.
American Society of Civil Engineers,	New York.
American Society of Mech. Engineers,	New York.
American Institute of Elect. Engineers,	New York.
Boston Chamber of Commerce,	Boston.
Bureau of American Republics,	Washington, D. C.
Consular Reports, Bureau of Statistics,	Washington, D. C.
Japan Cotton Spinners' Association,	Osaka, Japan.
National Association of Wool M'frs.,	Boston.
National Electric Light Ass'n.,	New York.
Western Society of Civil Engineers,	Chicago.

List of Periodicals Kept on File.

American Cotton Manufacturer,	Charlotte, N. C.
American Industries,	New York, N. Y.
American Wool and Cotton Reporter,	Boston.
Boston Journal of Commerce,	Boston.
Cassier's Magazine,	New York.
Cotton,	Atlanta.
Cotton,	Manchester, Eng.
Cotton Journal,	Atlanta, Ga.
Daily Trade Record,	New York.
Dry Goods Economist,	New York.
Dun's Review,	New York.
Dun's Review, International Edition,	New York.
Egyptian Cotton,	Alexandria, Egypt.
Engineer,	Chicago.
Engineering Record,	New York.
Fibre and Fabric,	Boston.
Freight,	New York.
Iron Age,	New York.
Lowell Textile Journal,	Lowell.
Machinery,	New York.
Manufacturers' Record,	Baltimore.
Mill and Shop,	Boston.
New England Shoe and Leather Association Monthly Gazette,	Boston.
New York Commercial,	New York.

Power,	New York.
Practical Engineer,	Philadelphia.
Protectionist,	Boston.
Technical World,	Chicago.
Textile American,	Boston.
Textile Manufacturers' Journal,	New York.
Textile Recorder,	Manchester, Eng.
Textile World Record,	Boston.

Respectfully submitted,

C. J. H. WOODBURY,
Secretary.

April 25, 1906.

Mr. FREDERICK A. FLATHER. Mr. President, I move that the report be adopted.

The motion was seconded by Mr. THISSELL and adopted.

The PRESIDENT. We will now listen to the report of the Treasurer.

TREASURER'S REPORT.

C. J. H. WOODBURY, TREASURER, IN ACCOUNT WITH THE NEW ENGLAND COTTON MANUFACTURERS' ASSOCIATION.

April 1, 1905 to April 1, 1906.

DEBTORS.

Cash,	$473 14	
Life membership,	500 00	
Active membership,	2,965 10	
Active admission fees,	740 00	
Associate admission fees,	650 00	
Associate membership,	1,630 00	
Interest,	138 49	
Sale of Transactions,	175 55	
Miscellaneous,	15 00	
Advertising,	1,395 42	
		$8,682 70

CREDITORS.

Board of Government,	188 00	
Office rent,	399 00	
Secretary and Treasurer,	2,000 00	
Reports of meetings,	105 00	
Amount forward,		$2,692 00

Amount forward,	$2,692 00	
Notices and stationery,	358 48	
Meeting expenses,	188 98	
Publishing and distributing Transactions,	2,235 10	
Engraving,	442 87	
Badges,	107 50	
Life membership fund deposited in Savings Bank,	500 00	
Miscellaneous,	49 92	
Postage, telephone and express,	128 46	
Advance copies of papers,	415 85	
Office supplies and furniture,	19 47	
Stenographer and proof,	831 25	
Medal and certificate,	38 35	
Expenses of Conference of Cotton Growers and Manufacturers,	46 47	
Payment of loan,	500 00	
Cash,	126 93	
		$8,682 70

The Association now holds the following funds for the specific purposes as set forth, and the income during the past fiscal year is as follows:

	PRINCIPAL.	INCOME.
Life membership fund,	$1,100 00	$40 69
Association medal and certificate fund,	1,000 00	44 65
Student's medal fund, (Donation of Moses Pierce),	200 00	8 90
Library fund, (Bequest of George W. Weeks),	1,000 00	44 65
Textile scholarship fund, (Donation of William Firth),	3,000 00	
	$6,300 00	$138 49

The principal of this fund is held in trust by the Treasurer of the New Bedford Textile School and the income sustains the scholarship in accordance with the provisions of the deed of trust executed by this Association and the New Bedford Textile School, February 20, 1902.

Invested as follows:

Bonds, (market value April 1, 1906, $2,050),	$1,935 11	
Savings Bank,	1,364 89	
Held in trust by treasurer of the New Bedford Textile School,	3,000 00	
		$6,300 00

AUDITOR'S REPORT.

I hereby certify that the amounts from April 1, 1905, to April 1, 1906, are correctly cast, that all payments are properly vouched for, that the funds are kept in deposit in the name of the New England Cotton Manufacturers' Association, and that the amount of the deposit April 1, 1906, agrees with the balance in the books, viz. $126.93.

The securities in which the Association funds have been invested have been examined.

C. F. ROBERTS,
Auditor.

BOSTON, MASS., APRIL 4, 1906.

The earnings of the Association for the year may be placed as:

5 life memberships at $100,	$500 00	
628 active dues at $5,	3,140 00	
175 associate dues at $10,	1,750 00	
77 active admission at $10,	770 00	
28 associate admissions at $25,	700 00	
Advertising,	1,180 00	
Miscellaneous,	329 04	
		$8,369 04

The disbursements of the year amount to $7,555.67, which is $813.37 less than the earned income.

Bills receivable:

Active dues and admission,	$375 00	
Associate dues and admission,	310 00	
Advertising,	330 00	
		$1,015 00

There are no bills payable.

The income derived from advertisements has enabled the Association to be conducted on the same basis as other technical organizations which are supported by higher assessments as well as by advertisements in their transactions. The receipts from this source have amounted in the several volumes of the Transactions to:

63	Philadelphia, October, 1897,	$385 00
64	Boston, April, 1898,	420 00
65	Crawford House, September, 1898,	450 00
66	Boston, April, 1899,	550 00
67	Montreal, October, 1899,	445 00
68	Boston, April, 1900,,	580 00
69	Washington, October, 1900,	665 00
70	Boston, April, 1901,	620 00
71	Pan-American, September, 1901,	595 00
72	Boston, April, 1902,	575 00
73	New York, September — October, 1902,	645 00
74	Boston, April, 1903,	745 00
75	Lenox, September — October, 1903,	705 00
76	Boston, April, 1904,	616 00
77	Bretton Woods, September, 1904,	650 00
78	Boston, April, 1905,	460 00
79	Atlantic City, September, 1905,	620 00
80	Boston, April, 1906, (already under contract),	405 00

The following table presents the finances of the Association for the past fourteen years.

Fiscal Year Ending April 1.	MEMBERSHIP.		TRANSACTIONS.			FINANCES.				
	Enrollment.	Members Elected.	Volume Number.	Pages in Volume.	Pages for Year.	Cash Receipts.	Expenses.	Cost per Page of Transactions.	Cost per Member.	Cost per Page of Transactions for each member Cents.
1891	246	18	48 49	43 62	105	$1,142 00	$ 926 08	$8 82	$3 76	3.59
1892	254	12	50 51	129 60	189	1,260 68	1,374 46	7 27	5 41	2.86
1893	244	31	52 53	63 94	157	1,678 33	1,603 25	12 22	6 57	6.33
1894	259	19	54 55	84 86	170	1,414 58	1,807 60	10 63	7 03	4.14
1895	270 292	35	56 57	73 230	303	1,947 07	1,957 64	6 46	6 71	2.21
1896	384 422	142	58 59	310 327	637	4,579 19	3,636 31	5 71	8 59	1.34
1897	450 459	49	60 61	269 359	628	3,710 02	3,980 34	6 33	8 67	1.43
1898	495 523	83	62 63	353 453	806	4,717 08	4,333 85	5 38	8 28	1.18
1899	535 554	42	64 65	321 380	701	4,713 56	4,775 97	6 81	8 62	1.23
1900	564 580	56	66 67	464 296	760	5,237 53	5,007 23	6 57	8 63	1.14
1901	603 628	78	68 69	382 476	858	6,331 93	6,295 55	7 34	10 02	1.16
1902	647 661	52	70 71	366 379	745	6,724 23	6,035 84	8 10	9 13	1.22
1903	681 699	66	72 73	342 415	757	6,768 81	6,701 65	8 85	9 58	1.26
1904	706 723	68	74 75	512 374	886	6,794 50	6,848 75	7 73	9 47	1.07
1905	744 761	66	76 77	376 313	689	7,080 31	6,797 04	9 86	8 93	1.29
1906	755 800	108	78 79	382 337	719	8,209 56	7,555 67	10 51	9 23	1.35

Respectfully submitted,

C. J. H. WOODBURY,

Treasurer.

April 4, 1906.

On motion of Mr. GEORGE P. GRANT, Jr., duly seconded, the report of the Treasurer was accepted and ordered placed on file.

The PRESIDENT. We will now receive the report of the committee on the Association medal.

AWARD OF ASSOCIATION MEDAL.

Mr. CHARLES H. FISH. Gentlemen, as chairman of the Association Medal Committee, consisting of Mr. WALTER E. PARKER, Mr. SIDNEY B. PAINE and Mr. DANIEL MOORE BATES, I beg to submit to you the following:

"As it might be supposed, your committee in the discharge of its duties, found itself confronted with an array of papers the excellence of which reflects great credit not only upon the authors but upon the Association as a whole. In choosing between the various papers, every point having a bearing upon their general credit or value was taken into consideration. The task, therefore, was not an easy one, but we trust that our award will merit your appropriation. From among all the papers presented we have chosen the one which, in our judgment, deserves this special recognition, showing, as it does, most patient and painstaking research and giving as it does the results which, by their generous completeness, cannot fail to be of great service to the Association and also to the profession at large. It gives us, then, great pleasure to award the Association Medal for the year 1905 to Mr. WILLIAM D. HARTSHORNE for his contribution: 'Some Comparative Data on Moisture in Cotton and Worsted.'" [Applause.]

Mr. WILLIAM D. HARTSHORNE: Mr. Chairman, this highly appreciated honor is indeed unexpected, a very unexpected surprise, quite as much so, I think, as on the first occasion when I received a similar compliment. I believe I can now comprehend the forcible remarks of your Honor, made to me a few weeks ago, which, at the time, I failed utterly to comprehend, and I think, perhaps, I agree with you that it may be a bad precedent, because you know that when a marksman has hit the bulls-eye twice in succession it is generally conceded

better for his reputation that he stop shooting. [Laughter.] Mr. Chairman, the ancient motto for my father's house was "*Res, non verba*," and I feel deeply the inherited inability to express my thoughts to you in words. If, however, I have succeeded in doing anything that will in any way benefit the industry, I am glad and shall feel encouraged, perhaps, to try again, even at the very great risk of failing to hit the bulls-eye the third time. I thank you, Mr. Chairman. (Here the medal was presented by the Chairman of the Committee to Mr. HARTSHORNE.) I take this opportunity, also, to thank the many members who have very graciously tendered me their congratulations upon this paper in the past. [Applause.]

NATIONAL FOREST RESERVES.

Mr. CHARLES H. FISH. Mr. President, I desire to submit the following:

"WHEREAS, The preservation of the forests at the head waters of streams rising from the Appalachian and White Mountains is an important element in the development of commercial enterprises, and would be of great benefit to the water powers on the rivers flowing from these mountains, and therefore, to all the cities, towns and mills, on these rivers,

"NOW, THEREFORE, RESOLVED, That the New England Cotton Manufacturers' Association, in annual meeting assembled, thoroughly approves and endorses Senate Bill No. 4058, for the purpose of acquiring National Forest Reserves in the Appalachian and White Mountains, to be known as the "Appalachian Forest Reserve" and the "White Mountain Forest Reserve," and further,—

"RESOLVED, That this Association earnestly urges the New England Senators and Representatives in Congress to give Senate Bill No. 4953, their constant and vigorous support."

I would move you, Mr. President, that this resolution be referred to the Committee on Resolutions.

The motion was seconded and carried.

WELCOME FROM THE INSTITUTE OF TECHNOLOGY.

The PRESIDENT. On several previous occasions, the Massachusetts Institute of Technology has extended its hospitality to our Association and we are very glad to come here again because it gives us an opportunity to meet the distinguished President of the Institute and to receive from him some words of welcome. I take this opportunity on behalf of the Association of thanking him for his many kindnesses in the past and of wishing for him great success in the new sphere of work which he is soon to take up. Dr. HENRY SMITH PRITCHETT, President of the Massachusetts Institute of Technology. [Applause.]

CAPITALIZING BRAINS.

HENRY S. PRITCHETT, LL.D., President Massachusetts Institute of Technology.

Mr. President, Fellow Members of the New England Cotton Manufacturers' Association :

I remember that in the French Chamber of Deputies the parties on the floor are classed as Right, Centre and Left, according to their political complexion. It is evident here that most of you belong to the Right, which I believe in the French Chamber of Deputies is the Radical Party. I take it, however, that this indicates in this gathering not so much the political complexion of the members as that inherent modesty which resides in every American breast.

I am here to say just a bare word of welcome to this hall of the Institute of Technology. We are never so pleased as when we welcome here some association of men connected with the manufacturing interests and the manufacturing work of this region, and I like to remember when you come here as an association that you are coming as a New England Association to a great New England college. In the proceedings which you have just had, your Secretary remarked that fifty-two years ago you started as a county association, later you became a New England Association. There is before you today a proposition to make of this a national association. In somewhat the same way the Institute of Technology started fifty years ago, a local institution. It grew to be a New England college and finally I think I may say with fairness it has come to be a national influence and a national power.

Perhaps I can say no other word to you than just a reference to this one connection which most strongly interests you and us, namely: you are today face to face with the problem of capitalizing brains, just as we in the Institute of Technology are face to face with the problem of capitalizing brains. I was interested to see a few days ago from a German paper the report of a distinguished visitor who came to us this winter to lecture in Harvard and the Institute of Technology — Professor OSTWALD of Leipzig. He spent some five months here and he was a keen observer. He has just gone home to his own country and has been making them some suggestions in the light of his observations made here, and they run along these lines: He said to his German compatriots: "It is evident from my examinations of the United States that in the matter of natural resources, in the production of the precious metals, of iron, of copper, the endowment of agricultural land, in the fisheries, in all the things which go to make the nation rich with natural resources, we are simply not in the same class with America. We can never hope to compete with it in that respect. In everything which makes up the natural material endowment of a nation, so far as that has to do with the resources of the soil, with the metals, with the fisheries, we are hopelessly behind the United States. But fortunately progress and the ability to compete — and we are the competitors of America today — fortunately the ability to compete does not depend on natural resources. We have a better organization than America. We have a better training of the individual citizen. We have a better system of education. We organize our men, whether they be workmen, whether they be engineers, whether they be scientific investigators — we organize them into more effective organizations, and our hope in holding our own in the race with America is to capitalize our brains. We have got better brains and if we will put behind them the right capitalization we can out-distance the Americans."

It is a significant word, coming from a German who has watched us with such close attention as Professor OSTWALD,

and I think it has a special significance to us people here in New England; and, although, as your President said a moment ago, I may perhaps not be always a citizen of New England, I shall always be one in affection and regard and in interest. It has for us a special significance in this respect; here in New England, compared with the rest of the United States, we cannot hope to compete in natural resources. We have not the vast endowment of iron mines, of gold mines, of copper mines, of rich agricultural land. We in New England, in competition — friendly competition, but competition none the less — with the rest of the United States, just as Germany in competition with the rest of the world, have got to depend mostly on our brains, and it is the equipping of our citizens in the most effective, the most efficient, the most practical way that is going to help us to keep up our end of the race. I hear every now and then a pessimistic wail about New England dropping behind, about New England not being able to keep up, about New England being decadent. If this sort of wail was a real expression of New England spirit, if it were a real voicing of the belief and the spirit of New England men, then our case would be a hopeless one, because the moment that a people really makes up its mind that it is distanced, it is distanced. Whenever a people really concludes that it is going to take No. 2 in the procession it is already No. 2. I do not believe that this represents for one moment the New England spirit or New England determination, nor do I believe there was ever a time when there was a better chance and a better opportunity for New England to hope for leadership in wealth, in manufacture, in education and even in politics. But in order that we may do it we need not to minimize but to frankly face the difficulties in the way, and we need to realize what the German has said to his compatriots — that our hope lies in the capitalization of our brains; that is, in the making of each individual citizen the most efficient economic unit that we can make him, and then to organize those economic units into the most efficient organization. So, if I may say one word with

you, it is that we feel in the Institute of Technology that we have one practical matter in common with you, and that is the capitalization of brains.

There has been started in Massachusetts within two months a very curious sort of movement looking to the taxation of institutions of learning. This is directly against the whole history of Massachusetts with respect to education. But it is worth remembering, aside from any matter of history, that at the very moment when New England is contemplating apparently the taxing of institutions of learning which have grown up almost entirely without State aid, the great states of the West and of the South are pouring into these institutions of their own endowments by the hundred thousand so that they may give to each citizen practically free a technical education of the most expensive and of the most perfect sort. I cannot but feel that in the future New England must not lay additional burdens on the educational institutions, but that it must frankly come forward and take some of the burden which heretofore the State has not carried. It must help us to capitalize the brains of the educational endeavor, whether it be in the more modest school which fits the foreman, the textile worker, the mechanic, or whether it be in the more ambitious school which fits the engineer for the work of the captain of industry. And if sometime in the future the Massachusetts Institute should knock at the doors of the General Court, — and I hope, my friend the Lieutenant-Governor will not feel alarmed if I make this expression — if some time or other the Institute of Technology should knock at the doors of the General Court of Massachusetts and ask for a million dollars for a site for its buildings, I hope that that request will not be considered in the light of a charity but in the light of a capitalization of brains, which is in the end the most real asset which New England has and the one upon whose development in the future it must most depend. And in that development we feel that we in the Institute of Technology are joining hands with you in the New England Cotton Manufacturers' Association. [Applause.]

The SECRETARY. Mr. President, I wish to call the attention of the members to the cordial invitation to visit the engineering laboratories of the Institute of Technology, which are on Trinity Place. On Thursday afternoon, Professor Gaetano Lanza will be there with his staff of assistants to receive the visitors and the testing apparatus used in the engineering instruction will be in operation, as is stated in the following cards of invitation which are being distributed.

Members and Guests
of
The New England Cotton Manufacturers' Association
are invited to visit
THE ENGINEERING LABORATORIES
of
The Massachusetts Institute of Technology
24 Trinity Place
(Between Boston Museum of Fine Arts and Hotel Westminster)
on
Thursday, April 26, 1906
2.30 to 4.30 P. M.

Prof. Gaetano Lanza will receive the vistors. A considerable amount of the apparatus will be in operation.

The PRESIDENT. It is not necessary for me to ask you to give a very cordial welcome to our esteemed fellow member who holds the high office of Lieutenant-Governor of Massachusetts, and who brings to us the welcome of the Commonwealth, His Honor, EBEN S. DRAPER. [Applause.]

WELCOME TO THE COMMONWEALTH.

His Honor, EBEN S. DRAPER, Lieutenant-Governor of Massachusetts, Hopedale, Mass.

I was very glad to accept your invitation to represent the Commonwealth of Massachusetts at this meeting, and to welcome you to the capital of our State.

I take special pleasure in welcoming to this Commonwealth the representative group of English manufacturers, who are here at the present time to study the methods of growth and preparation of the cotton staple. I sincerely hope they have had a pleasant trip through the country, and that they will have gotten sufficient information and knowledge to pay them for their long trip. While their object was, as I understand it, to find out more particularly in regard to the growth and preparation of the staple, I sincerely hope that their stay will be a pleasant one in the good old Commonwealth of Massachusetts, and I trust that they will carry back to the gentlemen whom they represent, a pleasant story of the way they have been treated by everybody in this country, including the New England Cotton Manufacturers' Association.

It has been a peculiar pleasure for me personally to see them here, because one or two of their members are personal friends of mine, who have been extremely courteous to me when I have been in their country.

I have been a member of this Association for twenty years or more, and have been a pretty regular attendant at the meetings, and have taken a great deal of interest in them. I can truly say that I think the Association has been a most successful one,

and that its meetings have been productive of great good, not merely to the members of the Association, but to all cotton manufacturers, throughout the entire country, and probably throughout the entire world.

There have been many able men in your membership, past and present, and the information that has been given to the manufacturing world, through the various prepared papers, and the discussions that have taken place at your meetings have had a great and beneficial effect upon the whole industry.

While the meetings of twenty years ago were very different in detail and character from those now held, I think there has been no time in the history of the Association when it was a more powerful organization for beneficial work than at present, and I congratulate the officers of the Association, and especially the efficient Secretary, who survives all changes of administration, on the excellent character and scope of the work now being accomplished.

There is no section in the country where a meeting of cotton manufacturers should feel more at home than in Massachusetts. The manufacture of cotton is one of the three great industries of our state, and I am happy to say that, at the present time, it is growing, and in a healthy condition. We have seen some dark days in the past, none more so than about two years ago, when you had to buy cotton from fifteen to twenty cents per pound and disposed of your product on the basis of about twelve cents per pound. But the industry survived these times, trying as they were and the prospects for the future prosperity of the industry relatively to other competing sections, are in my opinion greater today than they have been at any time for twenty years.

But much as I should like to enter on a discussion of the cotton industry in New England, that is not my function at the present time. I cannot refrain from calling to your attention some of the meetings which I attended when scarcely more than a boy, when I had the great privilege of hearing many discussions carried on by men of great ability, who have passed on. You will all remember the discussions and remarks of AMOS D.

LOCKWOOD, the great mill engineer, RICHARD GARTSIDE of Philadelphia, DAVID JOHN JOHNSTON, the able head of the great mills in Cohoes, Mr. EDWARD ATKINSON, recently deceased, who did so much for the perfection of the mill insurance system and my own honored father, GEORGE DRAPER. I do not refer to the many able men now living, nor to many of those who have passed away, but I have simply mentioned a few of the names of men who made many of your meetings useful and interesting by their able speeches and bright discussions.

But my function today is to welcome you to this city and Commonwealth, and I assure you it is a very pleasant duty for one of your members to have the proud distinction as Lieutenant-Governor of this grand old Commonwealth, to tell you that we are glad to see you and that Massachusetts appreciates the fact that she depends to a large extent for her great reputation in the sisterhood of states, upon the efforts of men who, like you, are managers of great business interests.

I sincerely hope that your meeting will be successful, that your stay here will be pleasant, and that in the future, as in the past, you will do great work in building up the industries of our grand old Commonwealth.

PRESIDENT'S ADDRESS.

JAMES R. MACCOLL, Providence, R. I.

Gentlemen of the New England Cotton Manufacturers' Association:

This convention is of more than ordinary interest because of the presence of a Commission representing prominent English spinners, who have come to this country to investigate the growing of cotton and other questions connected with the raw material. On behalf of our Association I extend to them a most hearty welcome. We trust that their visit may be of lasting value to the cotton industry of the world and that our intercourse may be of great mutual benefit. We congratulate our guests on the marvelous growth of cotton spinning in their country at the present time, the increase being 6,250,000 spindles. The realization of our dream of American supremacy in cotton manufacturing is for the time being interfered with. It is to be regretted that the Honorary Secretary of the International Spinners' and Manufacturers' Associations of Europe has been unexpectedly prevented from coming here at this time.

This eightieth semi-annual meeting reminds us that this Association is forty years old. It was organized in 1865 and the first meeting with recorded transactions occurred in July, 1866. By decades the record of membership is as follows: 1866, 71; 1876, 200; 1886, 225; 1896, 450; 1906, 876. At first the membership was confined to agents and superintendents of cotton mills in New England. In 1867 treasurers were admitted and in 1872 the words "in New England" were stricken out of Article 8 of the Constitution, thereby extending the membership to other states.

The transactions cover a wide and exhaustive range of topics, both commercial and technical, and are an interesting account of the development of cotton manufacturing in the United States. In the discussions two names are more prominent than any others, — GEORGE DRAPER and EDWARD ATKINSON. This Association has placed a memorial bust of GEORGE DRAPER in the textile school at Philadelphia, and I suggest that it would be equally fitting that some recognition should be made of the services rendered to our industry by EDWARD ATKINSON, who has passed away since last we met.

The National Association of Wool Manufacturers was organized one year earlier, in 1864, and since that time the two industries have had close rivalry for the first place. In 1870, 1880, and 1890 the value of wool products was ahead of cotton products, but in 1900 cotton took the lead, showing $339,000,000 against $297,000,000 for wool. Cotton is probably destined henceforward to be the first and most important textile industry of the country as regards capital invested, number of employees, and value of product.

In these forty years the number of spindles has increased from 6,000,000 to 25,000,000; the cotton crop, from 2,500,000 to 11,000,000 bales; and the cotton used in American mills, from 1,000,000 to 4,000,000 bales. Certain characteristics of cotton manufacturing in America are worthy of note. On account of our high-priced labor there has been continual effort to introduce labor-saving devices and methods. Only in this way could wages be maintained or increased, and cost of production kept sufficiently low to compete with foreign importations. To what extent this advantage can be maintained in the future, is a question. There is a limit to labor-saving devices, and in some cases we may have reached it. The Northrop improvements have enabled our weavers to handle twenty-four looms instead of eight, but it is unlikely that the future has in store much further numerical progress in this direction. Then, again, our foreign rivals have in recent years become more keenly alive to the necessity of introducing similar improvements. For a long

time the Northrop loom made no progress in Europe, but a recent circular of the Draper Company informs us that their European branch has 7,000 looms on order at present. This equalizing of conditions is therefore suggestive, especially in relation to our efforts to increase our exports of cotton goods.

Another feature of our manufacturing has been the continual progress that has been made, especially during the last twenty-five years, in the production of finer and more artistic fabrics and designs, notwithstanding climatic and skilled labor difficulties. It may without boastfulness be said, that in almost every class of cotton fabric there are some mills in this country producing goods equal in texture and novelty of design to any foreign productions. In many of our factories quality is sacrificed to quantity and cheapness, and designing consists in clever copying of foreign samples, but there is fortunately an increasing number of exceptions to these methods. The influence of our textile schools is beginning to be felt in turning out men with higher technical and artistic training. We can learn much from Germany as to how to combine state, municipal, and private philanthropic effort in establishing in every manufacturing centre a well-equipped textile school. Our country will need in the future many more thoroughly trained manufacturers, and also a force of men educated both commercially and technically to develop our cotton business in foreign countries.

In my address at our seventy-ninth meeting I referred at length to our export trade, and it is not necessary to occupy your time by repeating what was then said. The Special Agents of the Department of Commerce and Labor continue to do excellent work in sending from foreign countries information regarding the goods needed and the requirements as to packing, etc. It is probable that the request made to Congress by our Association and others for the appointment of a cotton commission, will have some definite result, possibly by the equipment of the Department of Commerce and Labor to do the work required.

The Bureau of Manufactures has kindly sent us a collection

of cotton fabrics imported into China, for exhibition during our meeting. A large business has been done with China, amounting to $34,000,000, out of a total of cotton exports for 1905, of $56,000,000; but our sales are mainly confined to unbleached goods, and there is a large opportunity in the classes of fabrics now exhibited. It is to be hoped that the feeling of antipathy to our country will be allayed by the enactment of the Foster Bill, which opens the door to all Chinese except the coolie class. This carries out the policy suggested by President ROOSEVELT, and has the support of numerous organizations.

We have been in correspondence with the Bureau of Statistics of the Department of Commerce and Labor regarding improvements in the classification of exports. Up to this time there have been only two classes, colored and uncolored. Bleached goods have been included in the latter. It is the intention of the Bureau to conform the export classification more closely to our import classification, and also to the statistics of other nations, by dividing exports into four classes: namely, unbleached, bleached, dyed or colored, and printed. The co-operation of our members and exporters generally is asked by stating on outward manifests, to which of the above four classes the goods belong.

Tariff revision is for the present abandoned by Congress, but there is another method of rewriting the law which is going on persistently. Customs lawyers, many of whom were formerly government officials, find it a profitable business to discover new and most ingenious interpretations of the tariff. They enter protests on behalf of importers and carry on the necessary litigation, for 50 per cent. of the amounts recovered from the government. By this means certain fancy cotton goods that were in the early years of the Dingley Tariff paying 45 per cent. duty, are now being admitted at less than five per cent., and there is an important case pending before the Supreme Court which if decided favorably to importers, would admit a large variety of fancy figured cottons at a lower duty than plain goods.

There is great need for this Association to appoint a strong tariff committee to give attention to all attempts to undermine the present laws and to render opportune technical and legal assistance to the appraisers, and to the Government in the courts of appeal.

Taking advantage of the widespread but entirely erroneous feeling that it was necessary to placate Germany by some concessions, the Merchants' Association of New York has been trying to secure a revision of the Customs Administrative Act. A small sub-committee published and sent to the Secretary of the Treasury a proposed revision of the law, prefixing to their report the names of a large committee that had been discharged six years before. Of the five names in this committee representing cotton goods and yarns, two are dead, and we have reason to believe that none of the others was consulted, or approved the action of the sub-committee. One of them, until recently a director of this Association, writes as follows:

"I have seen the report of the Committee on the Revision of the Customs Laws, and am not at all in sympathy with it. I was not consulted concerning this report, and knew nothing of its contents until I saw it reported in the newspapers. Some two or three years ago I received notice that I had been appointed as one of the General Committee on the Revision of the Customs Laws, but since then I have had no notice of meeting and have not been consulted in any way.

Two leading features of this proposed revision are open hearings in re-appraisement cases and the right to fix a price for exportation. These have been embodied in the Olcott Bill introduced into Congress on behalf of the Merchant's Association. The argument for open hearings is plausible and appeals on the surface to American fairness; but honest importers have declared that they are not suffering under the present law, otherwise than that the law is not stringent enough to save them from the competition of dishonest importers. They are willing by supplying information to assist the Government in suppressing undervaluation, but they can hardly be expected to expose their business to competitors and to submit to cross-

examination, and the loss of time incidental to legal proceedings. It cannot be denied that undervaluation exists to a large extent, that many classes of goods cannot be imported by our best houses, but have to be purchased from concerns to whom the goods are consigned, and that fortunes have been made by the consignment method of importation, at the expense of the Government. Some of the largest importing houses of the country say that should the Olcott Bill become a law, every honest importer would be driven out of the business. The Merchant's Association has done excellent service in many directions, but it should abandon work which is opposed to the interests of so many of its members, and which if successful, would only result in increased undervaluation and consequent injury to honest importers and domestic manufacturers. Secretary SHAW has clearly grasped the situation, and has been a valiant defender of the national pocketbook and also of legitimate American interests.

Government crop reports have recently been widely discussed and criticised. At our September meeting a resolution was adopted, asking President ROOSEVELT to appoint a commission to investigate the best methods of issuing these reports. Acting on the suggestion of Secretary WILSON, the President instructed the Keep Commission to perform this work. The report is a valuable contribution to the subject, clearly and forcibly pointing out defects and proposing remedies.

An accurate estimate of acreage is of fundamental importance. To improve this estimate, the Keep Commission advises an annual census or actual count by the Census Bureau. This seems preferable to the plan suggested elsewhere of a quinquennial census for the purpose of more frequently checking the annual estimates to be made, as in the past, by the Agricultural Department. An actual count is always better than an estimate based on a previous count.

The condition reports issued from June to November are the cause of much speculation, which is injurious to both growers and manufacturers. They are announced in the form of a per-

centage of what is called a normal crop standard of 100. What does 100 mean, and is the description used by the Agricultural Department, intelligible? Here is the official definition:

"THE NORMAL."

"So many of the reports of the statistician of the Department of Agriculture are based upon a comparison with the 'normal' that it is a matter of the greatest importance that there should be a clear understanding of what the normal really means.

To begin with, a normal condition is *not* an *average* condition, but a condition *above* the average, giving promise of *more than an average crop*.

Furthermore, a normal condition does *not* indicate a *perfect* crop, or a crop that is or promises to be the very largest in quantity and the very best in quality that the region reported upon may be considered capable of producing. The normal indicates something *less* than this, and thus comes between the average and the possible maximum, being greater than the former and less than the latter.

The normal may be described as a condition of perfect healthfulness, unimpaired by drought, hail, insects, or other injurious agency, and with such growth and development as may reasonably be looked for under these favorable conditions. As stated in the instructions to correspondents, it *does not* represent a crop of extraordinary character, such as may be produced here and there by the special effort of some highly skilled farmer with abundant means, or such as may be grown on a bit of land of extraordinary fertility, or even such as may be grown quite extensively once in a dozen years in a season that is extraordinarily favorable to the crop to be raised. A normal crop, in short, is neither deficient on the one hand nor extraordinarily heavy on the other. While a normal condition is but rarely reported for the entire corn, wheat, cotton, or other crop area, at the same time or in the same year, its local occurrence is by no means uncommon, and whenever it is found to exist, it should be indicated by the number 100.

Sometimes a favorable season for planting is followed by a favorable growing season, with no blight and no depredations by insects, the result being a normal condition. At other times the normal may be maintained by conditions that are exceptionally favorable in one or more particulars counterbalancing conditions that are unfavorable in other particulars. Thus, a crop may have had such an unusually good

start that it may pass without injury through a period of drought that would otherwise have proved disastrous to it, or its more than ordinary vigor and potentiality may fully offset some slight injury from insects.

The normal not being everywhere the same, in determining how near the condition of any given crop is to the normal, correspondents will usually find it an advantage to have a definite idea of what yield per acre would constitute a full normal crop in their respective districts; that is how many bushels, pounds, or tons per acre of a particular crop would be produced in a season that was distinctly but not exceptionally favorable. In a region where 30 bushels of corn may be taken as the normal, a condition of 90 would give a prospect of a crop of 27 bushels, and 80 a crop of 24 bushels. If 40 bushels is considered the normal yield, 90 (or ten per cent. less than the normal) would indicate a crop of 36 bushels, 80 one of 32 bushels, 70 one of 28 bushels.

For the reason that the normal, represented by 100, does not indicate a perfect or the largest possible crop, it may occasionally be exceeded. The condition may be so exceptionally favorable as to promise a crop that will exceed the normal, and it will accordingly have to be expressed by 105, 110, or whatever other figures may seem warranted by the facts; 105 representing five per cent. above the normal, 110 ten per cent., and so forth."

In the opinion of many manufacturers, members of cotton exchanges, cotton experts, and others, this definition is certainly not clear, and perhaps not comprehensible. It says that a normal condition is not average, not perfect, not the largest in quantity, not the very best quality, but that it is above the average, more than the average, greater than the average, less than the maximum, perfect healthfulness, unimpaired by drought, etc.

The suggestion has been made by Mr. SHEPPERSON and others that 100 should mean the condition at the same date of the previous year. The objections to this plan are the difficulty of recalling exactly how the growing plants appeared a year ago, and the fact that there would be no fixed standard, but, on the contrary, a continually varying one from month to month and year to year.

In criticising the use of decimal fractions in the condition

reports, the Keep Commission remarks that, "the present form of announcement carries with it the idea that the Bureau of Statistics is announcing a result arrived at with mathematical exactness by a mathematical process, when the most important steps in the process have not been of a mathematical character." This suggestion might be logically carried further by eliminating figures altogether from condition reports and using descriptive words; such as, excellent, good, fair, poor, bad; and stating the approximate number of acres coming under each classification in each State. Government agents in the cotton districts should have no difficulty in determining which of the above words applies most fittingly to the condition at time of report. Such reports would supply growers and manufacturers with satisfactory information regarding the condition of the growing crop, and at the same time materially reduce speculation, which is based on a mathematical figure. Condition reports should either be abandoned or issued in a different form. Why persist in a system which is so generally condemned, and which has proven so detrimental to legitimate trade by promoting speculation?

The suggestion of the Keep Report to convert the percentage figures of each month into bales, should not be adopted. It is quite inconsistent with the above quotation, and would certainly result in erratic estimates and extreme speculation. It would mean practically seven crop estimates, one each month, from June to December, and as shown on page 16 of the Keep Report, would have resulted in 1903 in an increased estimate of 1,900,000 bales between August and September, followed by a decrease of 1,700,000 bales in October. It is advisable, for all interests, to have reports of condition, but they should be merely descriptive of the present, and not mathematical as regards the final crop.

An Agricultural Department crop estimate early in December is evidently desired by many, especially in the South. It is argued that it should be published before a large proportion of the crop has been sold by the grower. Its accuracy has been

to some extent unfairly criticised. When computed in pounds, the estimates for the last six years, 1899 to 1904, inclusive, are very close to the final census reports of cotton ginned:

1899	Underestimate	3.1 per cent.
1900	Overestimate	0.2 "
1901	Underestimate	0.5 "
1902	Overestimate	0.4 "
1903	Overestimate	3.9 "
1904	Underestimate	4.2 "

In three years the crop was underestimated, and in three years, overestimated. The present crop is evidently again underestimated, by about 4 per cent. This is good guessing, and we have no cause to complain. We must either be willing to have it abolished, or be content with an estimate that may differ slightly in percentage from the actual final count. By postponing its announcement to a later date, greater accuracy might be expected, as a larger percentage of the crop would be ginned; but, on the other hand, it is argued that if an estimate can be made as accurate as in the past six years, the sooner it is known, the better.

The Census Bureau reports of cotton ginned have been found remarkably accurate when compared with the commercial crop. They are issued fortnightly during the ginning season, from September to January. It is a question whether the old method of issuing once a month was not better and created less disturbance in the market. Another view is, that they should be given out piecemeal, as received from the ginners, and thus destroy their explosive effect. They are statements of facts and should be welcome either fortnightly or monthly, proper allowance being made for variations on the same date from year to year, owing to early or late maturing of the crop.

Two other suggestions have been made; to have the monthly condition report given out at the same day and hour as one of the semi-monthly reports of cotton ginned from September to November, and the December crop estimate issued at the same

day and hour as one of the December semi-monthly ginners' reports; and that the crop estimate and the Census Bureau reports of cotton ginned be figured in bales of 500 pounds gross weight, thus creating a uniformity of statistical expression as regards weight of bales. As the returns from ginners contain average weight of bales, it seems feasible to do this, with possibly a slight adjustment at end of season.

It is in my judgment a mistake to advocate the abolishment of government crop reports. For all our information, we should then be at the mercy of private estimators. The general sentiment is in favor of improving government reports so that facts will predominate and guessing will be eliminated. The following program is suggested: an annual census of acreage, ginners' reports as at present, descriptive condition reports published simultaneously with ginners' reports, a crop estimate issued at same time as a ginner's report, uniformity of statistical weight of bales.

Perhaps the most important problems that the cotton industry has to deal with at present are related to the raw material. With the spindles of the world fully employed and rapidly increasing in number, an ample supply of cotton is essential. Our Southern states, which furnish 80 per cent. of the world's cotton, have acquired new wealth and financial independence, and are fully aware of the practical monopoly which they have in cotton raising. The growers of cotton are entitled to a fair and adequate profit, and they believe that this can be secured only by curtailing acreage, so that production will lag a little behind consumption. They figure that it will pay better to grow 10,000,000 bales at 12 cents per pound than 15,000,000 bales at 8 cents. Assuming the cost to be 5 cents, in the former case the profit is $350,000,000, with 12,000,000 acres which can be devoted to other crops; and in the latter case the profit is only $225,000,000. Their position as expressed by some of their prominent leaders, is this: "We are willing to grow all the cotton that the world needs, but why should we be punished if we grow a little more than can be consumed in any one year?

There should be some method devised of maintaining a steady price and carrying over the surplus for the lean years that are sure to come." To carry out this program, two conditions are necessary; first, the provision of ample funds to remove the surplus from the market and pay charges for storage, etc.; and, second, control of acreage so that the production would be sufficiently reduced in the following year, and a demand thereby created for the stored surplus. However desirable a steady price would be to both growers and users, we do not believe that such a program can be carried out, because of inability to meet the two conditions above stated. Capitalists will not risk their money in such a venture, and if there is a good profit in growing cotton, acreage cannot be reduced by sentiment and speech-making. The old economic laws will prevail. The average returns to the grower will yield him a profit equal to, or better than he can obtain from anything else to which he can devote his land and labor. If less than that, he will turn his attention to the something which is more profitable; if more than that, he will increase his cotton product, if it is in his power to do so; in other words, the farmer will grow what pays him best, and if the supply is short of the world's needs, the price will advance until the supply is again adequate.

Reduction of acreage is especially dangerous to our industry, because of the uncertainty of the yield per acre, which is so dependent on weather conditions during the growing season. In the last few years the yield per acre has varied from a maximum of .48 of a bale in 1898 to .35 per acre in 1903. Suppose that the acreage for the coming season is reduced 10 per cent. as advocated by the Southern Cotton Association, approximately 25,000,000 acres would be planted, which would yield 8,750,000 bales at the above-stated minimum, and 12,000,000 bales at the maximum. The minimum would mean a famine, paralyzing our industry, and inflicting dire distress on millions of workers and their dependents. Anything less than the maximum would be inadequate.

The close relation of supply to consumption and the uncer-

tainty during the growing season as to the final yield, are the two elements that afford speculators the opportunity to swing prices up and down. The business of the manufacturer is thereby rendered more precarious and less profitable than it otherwise would be, and the cotton grower loses part of the profit which properly belongs to him. The speculator's business is to a large extent illegal, and it is injurious alike to growers and manufacturers. Although much consideration has been given to the subject both in this country and abroad, no feasible plan has yet been devised to either eradicate or control it.

Now, what can manufacturers do, in view of these conditions? European spinners have been more keenly alive to the situation than we have on this side. The British and Continental Cotton Growing Associations have been formed to encourage and promote the raising of the staple in various parts of the world. The British Association has now a subscribed capital of $1,000,000, and its first report is full of encouraging accounts of progress, and assurances of final success in growing cotton extensively in new lands that are being opened up. A few extracts may be of interest:

"Judging by the experience of the work of the last twelve months, we are more convinced than ever that the British Empire can produce cotton of sufficient quantity and of suitable quality for the needs of Lancashire.

"There seems every probability of Ceylon growing a considerable quantity of long-stapled cotton, much superior to anything yet produced in India.

"The cotton produced in the West Indies is even superior to that grown on most of the best Sea Island plantations in South Carolina, and has realized 2d. to 3d. a pound more than American grown cotton.

"We can depend on the West Indies producing all that we require of the better qualities of cotton.

"West Africa has greater future cotton possibilities than any other portion of the British Empire. The total area of our West African possessions is over 500,000 square miles, with a population of not less than 20,000,000. This area of 500,000 square miles represents an extent of over 300,000,000 acres, which will not compare unfavorably

with the 400,000,000 covered by the whole of the Cotton States of Northern America. It is very probable that West Africa could devote as large, if not a larger area to cotton than is economically possible in the Southern States, where so many other industries and agricultural products are established.

"Extensive experiments are now being carried on with different varieties of seed, and the Council confidently expect that within two or three years' time West Africa will be producing large quantities of cotton superior to Middling American.

"The shareholders can congratulate themselves that they own the largest and the most up-to-date saw-ginning plant in the whole world, all of which has been made in this country, although twelve months ago it was impossible to buy a saw gin made in England.

"In all probability there will be over 40,000 acres under cotton in 1906 in British Central Africa.

"This season's cotton is now coming forward, and, generally speaking, is of excellent quality, and there is not the slightest doubt that large quantities of cotton, of Egyptian type, can be grown in Rhodesia."

The following extracts are from recent consular reports:

"The latest German reports on the growth of cotton in German East Africa and Togo show that the attempts to grow this important product have probably passed the experimental stage.

"Frenchmen who understand the business of cotton growing are making well-directed, practical efforts to utilize the soil and climate of Abyssinia, and they express their utmost confidence in their ability to produce an article that will compare favorably with the cotton grown in Egypt."

"The Secretary of the Colonial Cotton Association of Paris, states, 'We have reached a very important result in determining the price of Soudan cotton, delivered at Harve. We can lay cotton down at Harve at $7.42 per 220 pounds. This permits us to look forward to the possibility of competing with the United States when the yield will be large enough.

'Cotton is also produced in the French colonies of Indo-China and Madagascar. Great efforts are making in these colonies to produce cotton.'"

"It is predicted by experts that in the near future cotton in Queensland will be produced as economically and the quality equally as good as that grown in the Mississippi Valley."

The Southern growers should heed these warnings of coming competition, and should place more emphasis on reducing cost of production and less on securing high prices. By adopting more scientific and up-to-date methods, the quality and handling can be improved and the cost lowered. A large output at a fair price will in the end pay better than a small product at an exorbitant price.

European and American manufacturers have also been considering the advisability of growing their own cotton in the Southern States. This is in line with what is done successfully in other branches of industry. Manufacturers of steel own mines, paper makers own forests, oil refiners own wells, the International Harvester Company owns mines, forests, and hemp fields. Is it not a sound and feasible idea for cotton manufacturers to own cotton lands? If a huge cotton corporation existed like the steel trust, it would certainly seek to control its raw material, and that would be its most valuable asset. Not only would manufacturers get their cotton at cost, but by improved methods of ginning and baling, an enormous saving would be effected in waste, freight, and insurance. The present methods are disgracefully bad and should be revolutionized. American cotton has in recent years generally deteriorated as regards handling. Poor ginning injures the staple; baled cotton is left uncovered, and is damaged by the weather; the bagging is the heaviest and poorest that ingenuity can devise, and it is charged at the same price as cotton. With the experience of Egypt and India to follow in ginning and baling, there is no excuse for a continuance of present methods. An Egyptian bale is a model of neatness and compactness, with a light and strong covering, held together by proper hoops, and both bagging and hoops are deducted as tare, and not charged for as cotton. If spinners grew cotton, they would quickly adopt the very best system, and effect a great economy.

Estimates of the cost of growing cotton vary from 3 cents to 6 cents per pound. It is generally admitted that increased use of fertilizers, more careful selection of seed, and more intensive

cultivation would improve the quality, increase the quantity per acre, and reduce the cost materially.

Ten years ago the Department of Agriculture made an exhaustive inquiry regarding the cost of growing cotton. The average cost from over three thousand plantations located in every cotton growing state, was found to be 5.27 cents per pound; the average cost from twelve irrigated plantations in Texas, was 3.09 cents; and from three Government experiment stations, 4.09 cents; and in every state some plantations were producing cotton at less than 4 cents per pound.

Dr. S. A. KNAPP, the well known special agent of the Agricultural Department in the cotton growing states, had returns from over 8,000 planters regarding the cost of growing cotton in 1904. It was found that 4½ cents per pound was the average cost on all plantations producing one bale per acre. Dr. KNAPP states that with proper cultivation and selection of seed, the great bulk of the cotton lands of our country can be made to yield a bale to the acre.

In my last address I pointed out that "a mill of 200,000 spindles using 25,000 bales of cotton per annum, by growing its own cotton at a cost of 5 cents per pound less than the market price, would effect a saving of $625,000 or over $3 per spindle, which would pay 20 per cent. annually on the cost of an American mill, and 30 per cent. on the cost of a European mill." If such a mill owned 25,000 acres, producing a bale per acre and costing with all improvements and equipment $50 per acre, the return would be 50 per cent. per annum on the investment; or, if owning 50,000 acres and producing half a bale per acre, the return would be 25 per cent. If part of the cotton grown is not adapted to the manufacturer's mill, he can sell that portion and buy what he requires, without altering the result. The difficulties of labor and management can surely be surmounted as manufacturing difficulties are, by intelligence and energy. Cotton growing is not a highly developed industry, and skillful management on a large scale would work out many economies and improvements. A recent trip through the Southern States

convinces me that there are many millions of acres of the finest cotton lands in the world, waiting the enterprise of manufacturers to utilize them, and thus supply the raw material necessary for the future expansion of cotton manufacturing to meet the increasing requirements of the world.

The resolution adopted at our September meeting has resulted in arrangements being made for a conference of growers and manufacturers, to be held in Washington, May 1st and 2nd. There is widespread interest in this meeting and it is to be hoped that the bringing together of the producers and consumers of the raw material will have beneficial results.

Our industry is in the midst of a period of activity and prosperity, but, in my opinion, there are good reasons why the resources of mills should be husbanded and not applied too largely to dividends. Compared with our American mills, foreign cotton mills are on a very low basis per spindle, because of the original cost, and also the system so generally practised of writing off every year an arbitrary percentage for depreciation, whether there is a profit earned or not. We should aim at getting our plants down to a basis nearer to the foreign, for the time will surely come when, in order to retain our market and do any foreign business, we shall have to meet the competition of less costly plants and lower wages, with a diminishing advantage of labor-saving devices.

The PRESIDENT. What the Northrop loom is to the weaver, the telephone is to the mill manager. It is a labor-saving device; it makes life more strenuous but more productive. We are now to be favored with an address from the president of the American Telephone and Telegraph Company, Mr. FREDERICK P. FISH. [Applause.]

THE UNITY OF BUSINESS PURPOSE.

MR. FREDERICK P. FISH, Boston, Mass.

Mr. President and Gentlemen of the New England Cotton Manufacturers' Association:

As a representative of one of the youngest of the industrial arts, I assure you that it is an honor and a pleasure for me to speak to you who are so admirably managing and shaping the development of one of the very oldest of the industries upon which the well being of our race so largely depends. It is now only thirty years since the telephone first appeared as the result of the inventive genius of ALEXANDER GRAHAM BELL, while we find the origin of the manufacture of textile fabrics lost in the dim mist of the prehistoric past. I cannot say one word to you that is really germane to the work of your Association or to the purposes of your meeting. It seems to me that my function here is almost altogether to emphasize by the slightness and immateriality of what I shall say, the admirable and remarkable address that your President has just delivered, filled as it was with information of the kind that you ought to have, but which it is not easy for you to get because of the press of your ordinary every day duties. What he said was the type of what you ought to hear at these meetings, and I assure you, gentlemen, that there is not one word that I can say that will help you in the slightest degree in the prosecution of your business.

I do not feel, however, that there can be made — I shall not have time to make it — a somewhat interesting comparison between the telephone art, which in a sense I represent, and

the art of the manufacturer of textile fabrics, to which you gentlemen have given your lives. We started thirty years ago, at a time when the entire history of business had been consolidated in the existing institutions of the industrial arts, and nowhere were sound principles illustrated more definitely and clearly and with more effective results than in the art of the manufacture of textile fabrics. I can assure you, gentlemen, that those who have been responsible for the development of the telephone have sat at the feet of the cotton manufacturers from the beginning until the present time, and that we can have no higher ambition today than to carry out in our business the same underlying principles and methods, which have led to such admirable results in cotton manufacturing.

Our difficulties have been of the same character; our general aims the same. After our brief experience, we may not be able to say that we do our work as well as you do, but as was the case with your predecessors, nothing short of perfection will satisfy us and the time is at hand when we shall gratify our ambition by bringing our young art, enormously complicated, and intricate as it is, even to the high standard that you have attained in the thousands of years of your history.

As I look at it, the old original spun thread which was made by the distaff of the prehistoric man, and the fabric woven on the hand looms that are pictured in the records found on the banks of the Nile, were substantially the same as the corresponding products of the most modern machinery. But consider the enormous difference between the condition of your industry at the present time and that of the early days! And how has this enormous change come about? It has come about through the co-operation of all the workers in the art and through their careful and intelligent recognition of the fact that the things necessary in order to produce results that were satisfactory, were, first, a perfect product, and, second, the greatest possible economy in time. It is on those lines that the manufacturers of textile fabrics have worked from the beginning, raising their standards from generation to generation, and never for a

moment failing to recognize the field for further improvement. There have been radical inventions and constant changes from time to time in your art, but it seems to me that the most important and essential of the improvements that have been made, particularly the marked improvements of the last years, have been in the direction of saving time; that is, of producing a greater product for the same number of workmen, each man's time counting for more than it did before; a greater product for the same unit of floor space, each room turning out a larger production; a greater product per unit of investment, each dollar of expenditure producing more cloth. And here is one of the points in which your art and mine come together. We are contributing an enormous amount to the saving of time to your industry and to all other industries throughout the country. I do not propose to weary you by going far in showing you what I mean by that, but I can express by two or three illustrations the thought.

Last year, over our system, there were transmitted four billion, five hundred million messages; a very large number, over forty times more than all the telegraph messages and certainly more than half (I do not remember the figures) of all the letters and postal cards sent in the country. Now, what was involved in each one of those messages? First, and of prime importance, the fact that you could talk as if you were face to face, instead of having to telegraph or write back and forth. But next and of even greater importance, was the enormous saving of time; that is, by the telephone you could do in a few seconds, and completely, what it would take a messenger or the postal service or the telegraph service a substantially longer time to do, if used even once, and it might be necessary to use them many times before you could send back and forth the talk of a three minutes' conversation. The average distance over which those conversations were transmitted was undoubtedly substantially more than two miles per conversation, which means that the aggregate conversations for the last year over our telephone system covered twice four billion, five hundred million miles or

nine billion miles. The sun is only ninety million miles away so that you can see the distance that would have had to be travelled by a messenger or the postal department to convey the messages that were delivered by our telephone system last year. Our saving of time involved, of course, another most important consideration which you gentlemen in the cotton mills will appreciate, and that is that as there were no messengers involved, all the messengers who would have had to be employed to deliver all these messages, whether in the postal service or otherwise, were saved from that work, and released for productive work in some other direction. This matter of saving time is one of the many problems with which we are every day dealing exactly as you have always done. For example, there is one change that has practically been carried on throughout the country; that is, the transformation from the old magneto telephone to the modern system of common battery; which you will recognize, because in the case of the old apparatus, you had to turn a crank to ring the bell, while today you simply take the telephone off the hook. The aggregate saving in time in the messages sent last year by the use of the new apparatus was equal to six hundred thousand days of eight hours each.

It is to the credit of the cotton manufacturers that they have done their utmost to deal with these propositions of increasing product, perfecting material and saving time. The amount of machinery that you have thrown into the scrap heap during the last thirty or forty years, although it was not worn out, simply because you knew of something better to take its place, is extremely creditable to you. And in our enterprise we have the same burden of throwing away machinery right and left for the sake of improving our service, and for the sake of making that saving of time that is so essential to us as servants to the public. There is hardly a line in which you have worked in which we do not find ourselves following you, because our aspirations and yours are definitely the same. I was much interested today to find that the medal of the Association went

to one of your members for a study on moisture and its relations to your manufacture. Well, moisture seems to be an insignificant thing, but how necessary it is that it should be scientifically and intelligently studied for the purpose of your business! We are all the time working on refinements of the same class. We are studying constantly, from one end of the country to the other, through trained engineers and skilled observers, not only the big questions but all these small, subsidiary questions which are of the utmost importance, and which for us are innumerable because of the fact that our art is so young and matters have not yet been brought into the situation of definite stability which the cotton manufacturing art, I am glad to say, has reached. We have difficulties with heat and cold, moisture, lightning, storm, wind, snow and sleet. We suffer from the stupidity and carelessness and sometimes even from the viciousness of individuals who, rightfully or wrongfully, have access to our lines and our apparatus. We have to deal with apparatus infinitely more delicate and refined than that used in any other industry in the world. In a modern switchboard, for instance, there are four thousand miles of fine wire with two million soldered joints. Each relay on a line has in it a mile and a half of wire that is about the size of sewing cotton thread and there are tens of thousands of relays in each of our full sized switchboards. All those difficulties we have to face. We guard against them when we can. A great part of our study is aimed at securing a condition of things where they are less likely to occur. When the trouble comes, we strive to the utmost to cure it as promptly as possible. Every line is tested every night and the great majority of troubles that we have are never known to the subscribers. They know of enough, however, and when one comes to their notice, I regret to say that they do not always think how impossible it is to avoid them. The cotton manufacturers have had such troubles with their machinery in the past and they have them now. We look to you of all men for sympathy in our troubles, whether with our machinery, with our methods or with the discipline of our help, for you know how inevitable such

difficulties are. In all our problems we get along better than we should otherwise because of the fact that we came into existence as an operative enterprise at a time when we had the benefit of the experience for thousands of years of the textile manufacturers and the other manufacturers who have shown us how to work and the spirit in which to work. It is interesting to find what has been the result of those thousands of years of experience as illustrated, for example, in your art.

In an industrial enterprise, every effort must be made to perfect the machinery, you have shown that; there must be every effort to save time, you have show that; the product must be as perfect as possible, you have shown that; but you have learned and practised other things as the result of your experience which to me are most interesting. What is the purpose of your Association? You are competitors in every sense. The honorable ambition of each one is to make his own mill prosper, to make money for himself or his stockholders. And yet, competitors as you are, you get together year after year and openly and definitely disclose by your papers and addresses all that you have found out that you know will help your brother members in the trade. Mr. HARTSHORNE finds out exactly what are the problems in dealing with moisture and how to solve some of these problems. Does he keep it to himself? Not at all. He gives to every cotton manufacturer in this Association — which means to the world — the full benefit of all that he knows. And I believe that it could be demonstrated that there is nowhere in life more generosity, more good fellowship, more desire to help even where help might seem in the first instance to lead to personal, commercial and financial loss, than in such an organization as the New England Cotton Manufacturers' Association, and other organizations of the same kind which throughout the country and throughout the world bring together those who study the details of an art for the express purpose of such interchange of views as will advance the art.

I should like to have someone write a book which would be a popular history of textile manufacturers, not confining itself

to the mere sequence of machinery and methods, to the account of one invention after another, but dealing with the history of textile manufacturers as a living thing in its relation to society. If such a book were written by a man who had the right imagination, the right perspective and the right sympathy, by a man who looked at the subject from the point of view of the consideration of human thought and character and aspiration, I believe that it would be a most marvellously interesting book. It would picture the real instincts and the real thoughts of the human race, at its various stages and its real achievements as hardly anything else could. It would show the development of social and family relations, the growth of sound sentiment as far as the relations between employer and employee are concerned. It would show what are the underlying principles of business and the progress of commercial and manufacturing methods. It would show the development of that kind of organization in large and small ways which is so essential to the success in enterprises large and small and which is quite consistent with fairness and a good spirit all along the line, from the men who are primarily responsible for the results of an enterprise down to the most humble subordinate. It would bring out that throughout the history of the world, it has been by sound work, sincerity and fair dealing that enterprises have prospered. It would be a record of the fact that it pays to be on the most cordial terms not only with one's immediate competitors but with all men. It would teach the necessity of a co-operation in business which takes in not only those who work in the same art but all others; for taking it by and large, the prosperity of any one enterprise is intimately interwoven with and dependent upon the prosperity of all. Moreover, it would teach friendliness and good fellowship to the last degree. Such a book as that would teach a lesson to us of this practical day and generation which would not only be more easily absorbed but would be far more true than any profound work written deliberately by a professor of economics and sociology, dealing with the underlying questions of business, ethics and social relations. And I am satisfied that

if such a picture were presented by the right man, every one who read the book would say, that the study of the history of a single art would satisfy us that the human race has continually progressed because always working instinctively and automatically on right lines, that the same instincts which have caused it to progress in the past are at work today and that no matter how much we may be troubled by the conditions of today, the spirit of co-operation, coupled with individual effort and exercised with intelligence and fairness, which has always characterized the race in the past, will lead to its assured prosperity in the future.

And now one word more as to co-operation. I am very glad indeed that the question of making this a national association of cotton manufacturers has been brought up. Of course I do not know what is the result of the vote.

The SECRETARY. Affirmative.

Mr. FREDERICK P. FISH. The vote is in the affirmative. I am very glad of it. The time has come when in this great country of ours we should use our influence all over the country as far as we can, and there should be no north, south, east or west in cotton manufacturing or in the co-operation and the relations of the cotton manufacturers any more than there should be in any other of our relations. And I am almost inclined to take the liberty of offering, I will not call it a suggestion but a vague thought, that you may or may not think worthy of consideration. Might not the same movement which has led to your development into a national organization well go a step further? As cotton manufacturers, you are the brothers and the associates of every cotton manufacturer in the land. The National Association of Cotton Manufacturers is quite able to deal with all the interesting, technical and special questions that come up, such as those to which reference was made in the address of your President, and such as form the subject matter of your papers. By this Association you can get into close touch with each other and advance your prosperity and lift the standard of your art enormously for the

country and not merely for New England. There are many questions that are not definitely technical or special to your calling in which you have the most profound interest, some of them of the largest possible magnitude, which are now with us or which are looming up on the horizon. As citizens, as well as manufacturers, you are vitally interested in these questions. For instance, the question of socialism and the suppression of individualism is one that every one in this room must regard as personal and important to himself, to the interests that he represents, to the entire community and to the future of this country. There are others that are more nearly related to your special affairs but yet are interesting to an enormous number of people outside of your group. For instance, the general attitude to be assumed by those in authority and the people generally towards corporations; the effort to secure improvements in methods of government and other like social problems; the labor problem; the maintenance and development of the patent system, which I am sure has done more to establish the present condition of cotton manufacturing and of our industries generally than any other single element in our social organization. I will not go further, but there are many such questions and there are more coming. On all these information should be collected and sound views established and disseminated. It seems to me that The National Association of Cotton Manufacturers and the National Association of Wool Manufacturers and all the other national associations, which are doing so much by bringing together the individuals in each special art and by disseminating information as to all that is interesting and important in the development of that art, might well affiliate into a larger organization, made up perhaps of representatives from all of the more specialized organizations, and thereby put themselves in such relations as to be able to deal with these broad, underlying questions which interest us all. If this were done, all the members of all the existing national associations could and would get the same kind of information, the same benefit from mutual discussion and from the dissemination of sound

ideas that you now get as to the technical portions of your own special work. A general association of that sort, primarily made up of representatives from all the national manufacturing associations, which met to discuss and to consider the underlying questions that are of common interest, and which by publication, by conversation, and above all by organization, should learn and teach the truth and originate sound methods of dealing with these great subjects working in part through national associations like yours, would, I believe, be a most important force in shaping aright the thought of the community. Your general influence and the influence of each of you is enormous. The same is true of the other national associations and their members. If you could get together with all the other national associations and find out the lines upon which to work, not for selfish purposes but for the welfare and salvation of the community as a whole, and the dissemination of the right views on these questions that are coming to the front so rapidly, it seems to me likely that through these national associations more could be accomplished than in any other way.

Gentlemen, I thank you for listening to me so patiently, and for the pleasure of meeting you.

The following papers were read:

The Influence of Humidity, Temperature and Lubrication upon the Power of Textile Mills.

WILLIAM F. PARISH, Jr., 7 Reichstagsufer 16, Berlin, N. W., Germany.

Some Export Trade Humbugs and Fallacies.

EDWIN NEVILLE VOSE, 290 Broadway, New York City.

The SECRETARY. Mr. President before we adjourn for our recess there is a supply of copies of reports of the Second International Cotton Congress for distribution.

The PRESIDENT. The session is adjourned until two o'clock.

SECOND SESSION.

WEDNESDAY AFTERNOON, APRIL 25, 1906.

Meeting called to order at 2 P. M., President JAMES R. MACOLL in the chair.

The following papers were read:

Objects of the International Federation of Master Cotton Spinners' and Manufacturers' Association.
H. W. MACALISTER, 33 York St., Manchester, England.

Reminiscenses of Seventy-one Years in the Cotton Spinning Industry.
STEPHEN A. KNIGHT, Providence, R. I.

Cost of Raising Cotton.
EBEN C. WILLEY, Fall River, Mass.

Discussed by Mr. HENRY P. GREG, Manchester, England.

Wider Markets for American Goods.
C. A. GREEN, 290 Broadway, New York City.

Wool Prices and Cotton Prices.
FRANK P. BENNET, Jr., Boston, Mass.

THIRD SESSION.

THURSDAY, APRIL 26, 1906.

Meeting called to order at 10 A. M., President JAMES R. MACCOLL in the chair.

ELECTION OF MEMBERS.

The PRESIDENT. The first business before the meeting this morning is the election of members. I will appoint as tellers, Mr. GEORGE P. GRANT, Jr., and Mr. SIDNEY B. PAINE. They will be kind enough to distribute the ballots, containing the names of those whose election is recommended by the Board of Government.

The PRESIDENT. Have all voted who wish? If so, I declare the polls closed.

The tellers proceeded to the discharge of their duty, and subsequently reported that 46 ballots had been cast, all for the following:

ACTIVE MEMBERS.

JOSHUA D. ARMITAGE, Supt. Cloth Dept., Arlington Mills, 247 Haverhill St., Lawrence, Mass.

By WILLIAM D. HARTSHORNE.

WALLACE L. BALL, Agt. Consolidated Cotton Duck Company, Columbia Mills Co., Columbia, S. C.
By EDWARD W. THOMAS.

JOSEPH W. BALLARD, Supt. Griswoldville Mfg. Co., Griswoldville, Mass.
By FRANK S. FIELD.

HAROLD C. BARNEFIELD, Treas. Hays Textile Co., Pawtucket, R. I.
By ROBERT BURGESS.

WILLIAM M. BATT, Asst. Treas. The Davol Mills, Box 73, Fall River, Mass.
By GEORGE H. HILLS.

JOHN H. BINNS, Supt. Dyeing and Finishing, Arlington Mills, Lawrence, Thornfield, Methuen, Mass.
By WILLIAM D. HARTSHORNE.

JOHN B. BIRD, Engineer, Joseph Bancroft & Sons Co., Wilmington, Del.
By WILLIAM P. BANCROFT.

ROBERT BISHOP, Robert Bishop Mfg. Co., 157 West 6th St., South Boston, Mass.
By DANIEL J. DANKER.

EDWARD R. BLANCHARD, Mgr. Glenlyon Dye Works, Phillipsdale Branch, 25 Elmgrove Ave., Providence, R. I.
By JAMES R. MACCOLL.

ROBERT BLOOD, of John Blood & Co., 7th and Somerset Sts., Philadelphia, Pa.
By ROBERT BEATTY.

J. B. BOLTON, Supt. New York Mills, New York Mills, N. Y.
By JOHN A. FERNLEY.

WILLIAM V. BOYD, Asst. to Mgr. Canadian Colored Cotton Mills Co., P. O. Box 76, Cornwall, Ont.
By S. GREENWOOD.

NORMAN E. BORDEN, Sec'y Lowell Weaving Co., Lowell, Mass.
By P. T. JACKSON, Jr.

STEWART F. CARTER, Superintending Chemist, Atlantic Fibre Co., Park Place, Suffern, N. Y.
By JOHN P. MARSTON.

ARNOLD B. CHACE, Treas. Valley Falls Co., Albion, R. I.
By ROBERT BURGESS.

W. C. COBB, Supt. Ware Shoals Mfg. Co., Ware Shoals, S. C.
By CHRISTOPHER P. BROOKS.

WILLIAM A. CONGDON, Agt. Whitman Mills, 720 County St., New Bedford, Mass.
By WILLIAM WHITMAN.

ROBERT A. COPELAND, Supt. Yarn Mills Perry Knitting Co., Perry, New York.
By HARRY D. LORD.

THOMAS D. COVEL, Director, Davis Mills, Fall River, Mass.
By JOHN F. HAMLET.

FREDERICK E. CUNNEEN, Asst. Supt. Seaconnet Mills, Fall River, Mass.
By CHRISTOPHER P. BROOKS.

GEORGE DELANO, Supt. Bourne Mills, Fall River, Mass.
By JOHN H. HOLT.

HENRY B. DEMING, Prest. Deming Braiding Co., Box 555, Providence, R. I.
By JAMES R. MACCOLL.

CHARLES S. DOGGETT, Director, Textile Dept., Clemson College, Clemson College, S. C.
By EDWARD W. THOMAS.

BENJAMIN FORSTER, Supt. Weaving, I. E. Palmer Mill, 384 Main St., Middletown, Conn.
By HENRY D. MARTIN.

JOHN W. FOSTER, Asst. Supt. Print Works, Hamilton, Mfg. Co., Lowell, Mass.
By CLARENCE N. CHILDS.

ARNOLD C. GARDNER, Treas. Manomet Mills, 76 Bedford St., New Bedford, Mass.
By WILLIAM WHITMAN.

J. WHIDDEN GRAHAM, Supt. St. Croix Mill, Canadian Col'd Cotton Mill Co., Milltown, New Brunswick.
By S. GREENWOOD.

WILLIAM K. GREER, Asst. Supt. Eclipse & Beaver Mills, P. O. Box 258, North Adams, Mass.
By HERVEY BURNHAM.

FRANK B. GUSTAFSON, Asst. Mgr. I. E. Palmer Cotton Spinning Mill, Middletown, Conn.
By HENRY D. MARTIN.

ALTON L. R. HAMBLY, Supt. Quidnick Mfg. Co., Quidnick, R. I.
By JOHN H. HAMBLY.

CHARLES HAYES, Jr., Acting Supt. Skenandoa Cotton Co., Utica, N. Y.
By E. Y. WOOLLEY.

WILLIAM P. HEINEKEN, Gen. Mgr. and Sec'y Union Mfg. and Power Co., Union, S. C.
By EDWARD W. THOMAS.

JOSEPH B. JAMIESON, Prest. The Holmes Knitting Co., 77 Summer St., Boston, Mass.
By STEPHEN A. KNIGHT.

W. H. JILLSON, Mfr. Cotton Yarns, Westfield, Mass.
By GEORGE A. AYER.

NELSON D. KEABLES, Mech. Supt. Mass. Cotton Mills, Lowell, Mass.
By WILLIAM S. SOUTHWORTH.

HARTLEY L. LORD, Gen. Mgr. Union-Buffalo Mills Co., Union, S. C.
By JOSEPH D. AIKEN.

W. H. MACDONALD, Asst. Supt. St. Croix Mill, Canadian Col'd Cotton Mill Co., Milltown, New Brunswick.
By S. GREENWOOD.

FRED B. MANLEY, Treas. Spencer Yarn Co., Adamsdale, Mass.
By GEORGE E. SPOFFORD.

EDWARD J. MCCAUGHEY, Sec'y Home Bleach & Dye Works, Pawtucket, R. I.
By DANIEL J. DANKER.

ROBERT P. MCEWEN, Supt. Lambeth Rope Corp., 64 Willis St., New Bedford, Mass.
By SAMUEL TAYLOR.

SIMON MILLER, Member Firm, Jacob Miller Sons & Co., Borich Mills, 16th and Reed Sts., Philadelphia, Penn.
By SIMON FRIEDBERGER.

WILLIAM F. MORGAN, Treas. & Gen. Mgr. Fitchburg, Duck Mills, Fitchburg, Mass.
By FREDERICK S. GREENE.

WILLIAM A. NICHOLS, Mill Supt., 120 Pine St., Fall River, Mass.
By HENRY D. MARTIN.

LOUIS ATWELL OLNEY, Prof. Chemistry & Dyeing, Lowell Textile School, Lowell, Mass.
By WILLIAM D. HARTSHORNE.

CALVIN D. PAIGE, Treas. Central Mills, Southbridge, Mass.
By GEORGE A. AYER.

WILLIAM E. PECK, Agt. The Baltic Mills Co., Baltic, Conn.
By JOHN ECCLES.

H. M. PEIRCE, Agt. Greenwich Bleachery, East Greenwich, R. I.
By ROBERT BURGESS.

AARON C. PHELPS, Vice Prest. & Gen. Mgr., German-American Co., Spray, N. C.
By ARTHUR J. DRAPER.

ROBERT PLACE, Supt. Flint Mills, Fall River Mass., Corr Mills, Taunton, Mass., 212 Weybosset St., Fall River, Mass.
By JOHN H. HOLT.

FRANK PORTER, Jr., Supt. Danielson Cotton Mill, Danielson, Conn.
By HENRY D. MARTIN.

F. J. QUINN, Agt. Fiskdale Mills, Fiskdale, Mass.
By M. W. QUINN.

WILLIAM H. RENNIE, Supt. Warren Mfg. Co., Warrenville, S. C.
By T. H. RENNIE.

GEORGE W. ROBERTSON, Supt. Dan River Cotton Mills, Danville, Va.
By JOHN P. MARSTON.

ISRAEL P. ROUNDS, Supt. Naushon Co., 20 Maynard St., Pawtucket, R. I.
By ROBERT BURGESS.

FRANK A. SAYLES, Prop. Sayles Bleacheries, Prest. Lorraine Mfg. Co., Pawtucket, R. I.
By JAMES R. MACCOLL.

JOHN SKINNER, Asst. Treas. West Boylston Mfg. Co., Easthampton, Mass.
By GEORGE A. AYER.

ARCHER J. SMITH, Treas. The Amer. Mills Co., Waterbury, Conn.
By JAMES R. MONTGOMERY.

RUFUS A. SOULE, Jr., Treas. Taber Mill, New Bedford, Mass.
By SAMUEL TAYLOR.

FREDERIC TABER, Prest. Taber Mill, New Bedford, Mass.
By SAMUEL TAYLOR.

FRANK S. TUCKER, Supt. The Clark Mile End Spool Cotton Co., East Newark, New Jersey.
By ADAM H. GROEL.

FRED UNGER, Supt. I. E. Palmer Mills, Middletown, Conn.
By HENRY D. MARTIN.

JOSEPH WASSERMAN, Member of Firm, Philadelphia Tapestry Mills, Allegheny Ave. and Front St., Philadelphia, Pa.
By WILLIAM G. HENRY.

CLARENCE WHITMAN, Treas. Wilkesbarre Lace Mfg. Co., Leonard St., New York City.
By JAMES R. MACCOLL.

W. T. WHITEHEAD, Mgr., Dominion Textile Co., Montreal P. Q. Canada.
By WALTER E. PARKER.

REX G. WITHERBEE, Asst. Supt. Utica Steam and Mohawk Valley Cotton Mills, Utica, N. Y.
By HENRY F. MANSFIELD.

WILLIAM P. WOOD, Supt. Royal Weaving Co., Pawtucket, R. I.
By ROBERT BURGESS.

MARCUS J. WOODROW, Supt. Clinton Mfg. Co., 93 Clinton St., Woonsocket, R. I.
By ALMOND E. BOSWORTH.

GEORGE W. WRIGHT, Supt. Shove Mills, Fall River, Mass.
By GEORGE E. SPOFFORD.

FOR ASSOCIATE MEMBERSHIP.

CHARLES A. BOWEN, Treas. and Gen. Mgr. S. C. Lowe Supply Co., 87 Union St., New Bedford, Mass.
By SAMUEL TAYLOR.

STEWART W. CRAMER, Southern Agt. The Whitin Machine Works, Woonsocket Machine & Press Co., Charlotte, N. C.
By R. M. MILLER, Jr.

E. T. FOWLER, Treas. and Mgr., Foster Machine Co., Westfield, Mass.
By GEORGE A. AYER.

HARRY S. GREENE, Vice Prest. Woonsocket Napping Machinery Co., Woonsocket, R. I.
By ROSCOE S. MILLIKEN.

HENRY S. GREENE, Treas. Woonsocket Napping Machinery Co., Woonsocket, R. I.
By ROSCOE S. MILLIKEN.

RUSSELL GRINNELL, Vice Prest., General Fire Extinguisher Co., P. O. Box 89, Providence, R. I.
By FRANK H. MAYNARD.

HUGH NELSON, Mgr. Casualty Co. of America, 52 William St., New York City.
By SIMON FRIEDBERGER.

JAMES M. PRENDERGAST, J. M. PRENDERGAST & Co., Brokers in Cotton Cloths and Yarns, 87 Milk St., Boston, Mass.
By FRANKLIN D. WILLIAMS.

ELWIN H, ROONEY, The Whitin Machine Works, Whitinsville, Mass.
By WILLIAM W. BLADES.

FREDERICK P. SHAW, Prest. and Gen. Mgr. Shaw Machine Co., Lowell, Mass.

By EARL A. THISSELL.

JACOB STEPHANS. Gen. Mgr. William H. Haskell Mfg. Co., Pawtucket, R. I.

By GEORGE E. SPOFFORD.

The PRESIDENT. I declare that the above named are elected members of the Association.

GOVERNMENT CROP REPORTS.

The PRESIDENT. While we are waiting for Mr. MOORES, who is to read the first paper, I would like to call upon Mr. SANFORD to speak upon the question of Government Crop Reports.

Mr. ARNOLD B. SANFORD. Mr. President and fellow members of the Association: I noticed yesterday that you called attention in regard to the Government Crop Bureau reports. Of course we have all been more or less exercised on this question during the past year. I think, Mr. President, this is the proper time to discuss this question because we are all so vitally concerned in it. It is not only for the New England cotton manufacturers to consider but for the cotton manufacurers of the world, and we now have assumed the name of The National Association of Cotton Manufacturers. A great deal of adverse criticism has been made in regard to the government reports. There has been leakage, and all kinds of charges have been thrown at the government on account of the way in which these reports have been given out. I for one have publicly expressed my opinion once before on this matter as being an objector to the methods employed by the government, but in so doing I did not wish to go on record as being opposed to having this work done by the government, for I think it better to have it come from that source than it would from private individuals, because there would enter in more speculation than we

have had in the past through the Government Bureau. Of course we cannot tell just at this stage what is best to do, but I think it is proper and eminently fitting that this Association should pass some resolution at this time and discuss the question as to what is the best method of obtaining statistics in regard to the cotton crop of the United States. I think, Mr. President, I have said about enough in just calling the attention of the members to the matter, and you yourself have outlined a very admirable way of handling the subject but I think the matter should receive the combined action of both Associations, The Southern Spinners Association and The American Cotton Manufacturers' Association that both should co-operate, and special committees be formed with power to act for us and advise with our representatives in Washington. You notice that Mr. LOVERING and Congressman GREENE are now opposing the appropriation in the Agricultural bill. They want to eliminate the support of the government. They may have back of that some better method. Of course I want to give them credit for their work if they are doing it in the right direction, but do not think we ought to sit idly by as manufacturers and let them formulate the plan. I think we ought to have a part in it, Mr. President.

The PRESIDENT. The Committee on Resolutions intends to submit a resolution to the meeting providing for the appointment of a committee on Crop Reports to act for the Association, and this matter will no doubt come up also at the conference in Washington on May 1 and 2, when there will be present representative cotton manufacturers, both from abroad and from the Southern States and New England, and also planters and delegates from cotton growing and ginners' associations. I shall be very glad to hear further remarks on this matter of crop reports. I wish the discussion might be continued while we are waiting for Mr. MOORES to arrive.

Mr. ARNOLD B. SANFORD. It seems to me very fitting that some action should be taken. If the congressmen from Massa-

chusetts are now at work on the matter we want to get our work in, too. I should like to hear from Mr. KNIGHT.

Mr. STEPHEN A. KNIGHT. I have nothing special to say in regard to the matter. I sympathize with Mr. SANFORD in his remarks and I too feel that this Association, its magnitude and importance should be recognized and that there should be some method adopted whereby we could be represented before the committee of Congress on this particular subject. It would seem to me eminently fitting that a committee should be appointed for that especial purpose. I should be very much pleased if that could be done.

The PRESIDENT. There is, I think, a widespread feeling that our Association should take the lead in this matter and try to decide what the manufacturers want. I have talked with a great many cotton merchants, manufacturers and planters within the last few weeks while traveling through the South with our English friends. There is a great diversity of opinion, and yet I think there is some harmony of opinion running through it all. There is need of reform in government crop reports. There is a general opinion that guessing and inaccuracy should be eliminated and that reports from the government should be correct and to a large extent a statement of facts. And I think as soon as we make up our minds what we want and go about it in the right way, we can probably have it accomplished. Perhaps Mr. TOMPKINS would say a word to us on this question. I have no doubt he is thoroughly familiar with it.

Mr. DANIEL A. TOMPKINS. Mr. President, I believe that we ought to have reports from the national government and that the reports ought to be wholly reliable. We never can get this through the Department of Agriculture by any system of guessing, for two reasons: those living in the cotton belt cannot guess much better than anybody else can, and, secondly, the temptation to guess wrong on purpose in order to get benefits in the way of speculation are too great to expect that from time

to time some one man will not succumb to the temptation. The present system of reports through the Census Bureau are no better now than those of the Department of Agriculture, for the reason that there is no way of making them accurate. The farmers and ginners, the season before this one, reported their crops fully, and they all feel that they did serious damage to themselves by giving up information that they were in no way obliged to give and under no obligations to anybody to give up. When it was finally made known that there would be something like thirteen or thirteen and a half million bales the price dropped to an extent that did serious injury to the farmers and to the ginners, who had yet held cotton, and they have themselves felt that they themselves were the instruments of that injury which they received. As a consequence, not being compelled by law, being under no obligation to look after the interests of the spinners, but rather under a deep obligation to look after the interests of themselves and their families, they feel very much as everybody else does, that the more they keep their business to themselves for their own interests the better off they are, and as a consequence many of them do not give accurate reports to the government. The greater number of those who have conscientious scruples leave the Census Bureau man to guess at it himself and let it go. Therefore the present reports of the Census Bureau are not information, but they are misinformation, and we should either abolish all reports or provide that the reports should be complete and a failure to make a complete report be punished properly and every ginner be made to report under oath. It is quite an undertaking to bring that about. It sounds to the ginner sumptuary. He wants to know, "Why don't you expose the business of the cotton spinner to me, if you are going to expose my business to the cotton spinner?" And yet without compulsion on the part of the ginner to make a report and a whole report and nothing more than a report, and some punishment for his failure, I do not believe you can accomplish anything. The extent to which that is feasible is a matter for the law makers and not for me.

Whether it would be right to enforce an exposition of the situation of the ginners' interests more completely than any other interest and for the benefit of any other interest would be a question to be argued when the law is discussed.

Besides a compulsory report from the ginners, and a complete report, it is exceedingly important that there shall not be two days' cumulative information that can be sold. Therefore, instead of having five census-takers cover a district in a week and try to make the report up to a particular point, I would appoint only one and let him go around in a month and let him make a report from each gin that he visits each day and post a mailing-card to Washington telling the amount of cotton ginned and have a report published daily showing the amount of cotton ginned up to the day before and the additional cotton ginned up to that, date published at twelve o'clock. For example, "Up to yesterday at twelve o'clock the total of cotton ginned was 3,000,000 bales. In the last twenty-four hours cards have come in reporting the ginning of 125,000 more bales. Therefore, up to twelve o'clock today the ginners' report is 3,125,000 bales." The Census department has said that that would be expensive, and yet I cannot see how it would cost one cent more to appoint one census-taker to go around to a certain number of gins in a month than to appoint five census-takers to get around to those same gins in one week. It looks to me as if it would cost the same money and possibly less, for the reason that you can get one man cheaper for continuous employment than you can get five men for one week's employment and then they be out of a job for three weeks. I regard the report by the day as being even more important than the compulsion of reports from the ginners. There is no possibility to make information cumulative even for five days and not have it sold by somebody in the great force of clerks. Even if in the end separate states or separate sections are added up separately and are brought together at the last hour, if you can get the color of two or three sections you have got the color of the speculative market and it is bound to be utilized for that purpose. I

should, therefore, very strongly take the ground that we must have no reports that are based upon guesses of any kind. We must have reports made upon actual figures taken on the ground at the gin. Those reports must all be sent in daily and the ginners must be compelled to report.

Now, if we can bring about that situation we will all be very much benefitted. We will have early knowlege of what the crop is approximately. We will keep up with it daily and there will be no speculative market which hinges on the reports that are made cumulatively; and if we cannot do that, I am against all reports. If we cannot make the report daily, I am against all reports. [Applause.]

The PRESIDENT. Is it not a fact, Mr. TOMPKINS, that the Census Bureau reports of ginning have been very accurate during the last few years? I have carefully compared the figures with the commercial crop as stated by the Financial Chronical and by Mr. HESTER of New Orleans and it seems to me that the census reports of cotton ginned have been accurate every year.

Mr. DANIEL A. TOMPKINS. I stated in the first place that in the season before this one the reports were pretty full and I think preceding that they did very good work. But in the report of the season before this the foundation was laid for very inaccurate reports for all time in the future, for the reason that the ginners and the cotton planters believed that those reports were the instruments of their undoing so that in the future, I do not believe you will ever get as accurate reports again as you have had unless there is some new means adopted such as I have suggested.

The PRESIDENT. I admit I do not quite understand how Mr. NORTH gets the reports so accurate because there is certainly a great temptation for ginners not to report correctly.

Mr. DANIEL A. TOMPKINS. The question of the degree of inaccuracy since the report of the thirteen and a half million bale crop nobody knows yet, because we do not know what cotton is going to come in by September. It may be accurate still, for all I know. But I do feel that there is bound to be a factor of uncertainty in it unless we find some way to get compulsory reports, the right to do which I question. But also, as I stated in my remarks, I believe that daily reports are even more important than the compulsory feature. A daily report from the census bureau is the right thing and I believe in addition to that it might be well to have it complusory.

The PRESIDENT. Are there any other remarks on the subject of government crop reports?

I will ask Mr. AYER to submit the report of the Committee on Resolutions.

REPORT OF COMMITTEE ON RESOLUTIONS.

Mr. GEORGE A. AYER. Mr. President, the Committee on Resolutions beg to report four resolutions: the first, the proposed resolution regarding Forest Reserves, read yesterday.

FOREST RESERVES.

Whereas, The preservation of the forests at the head waters of streams rising from the Appalachian and White Mountains is an important element in the development of commercial enterprises, and would be of great benefit to the water powers on the rivers flowing from these mountains, and, therefore, to all the cities, towns and mills on these rivers,

Now, Therefore, Resolved, That the New England Cotton Manufacturers' Association, in annual meeting assembled, thoroughly approves and indorses Senate Bill No. 4953, for the purpose of acquiring National Forest Reserves in the Appalachian and White Mountains, to be known as the "Appalachian Forest Reserve" and the "White Mountain Reserve" and further

Resolved, That this Association earnestly urges the New England Senators and Representatives in Congress to give Senate Bill No. 4953, their constant and vigorous support.

Mr. GEORGE A. AYER. I move the adoption of the resolution

The PRESIDENT. Is the motion seconded?

The motion was seconded by Mr. WALTER E. PARKER and being put to vote the resolution was declared adopted.

Mr. GEORGE A. AYER. Second, a resolution on Chinese exclusion.

CHINESE EXCLUSION.

Whereas, The present Chinese exclusion laws have tended to create a feeling of antagonism in China to America and American cottons; and

Whereas, every impediment to the extension of export trade in cotton goods should be removed.

Be it Resolved, That this Association in convention assembled approves and endorses the Foster Bill and urges Congress to provide such legislation as will tend to establish more cordial trade relations.

The resolution was seconded by Mr. WALTER E. PARKER.

The PRESIDENT. I would like to ask Mr. TOMPKINS to favor us with a few words on this subject. I know he is posted on it because he appeared in Washington in favor of the Foster bill and I should like to know a little of it from him.

Mr. DANIEL A. TOMPKINS. Mr. President, gentlemen: We have a treaty with China which was finally ratified by both countries after some little disturbance and trouble. Under that treaty there were three very important provisions. One was the agreement of both countries that cheap Chinese labor should be

excluded by this country from this country. Another was that the facilities and regulations in China should be of a kind that would foster and extend American commerce in that country, and the third was that the missionaries from this country should be fully protected in China. The execution of the statutes at most points in the United States seems to have been more or less, since the treaty, under the control of trades union influences and the interpretation of the statute laws under the treaty has been of a kind to absolutely keep out all Chinese labor, and still further interpreted that if it is necessary to keep out every Chinaman in order to keep out a few laborers who might otherwise get into the country, why, then that is the way to interpret the law. It was under that sort of interpretation that some Chinese people who had a perfect right to enter this country were detained here in Boston and kept over night in the Custom House. And while I think that the Chinese people have laid very unusual and unnecessary stress upon that detention, nevertheless it was an infraction of our treaty with China. And while the single incident might not have justified the objections which they have made, yet, the incident being a type incident, does justify the objections they have made. In the discussion of this subject before the House Committee at Washington the labor union influences were very conspicuous and many of the members of the committee seemed to be advocates of that particular view of interpreting and executing the law. In most cases they seemed to take the attitude that if the present laws and the present methods of executing them do keep cheap Chinese labor out of this country, then would you want to change them? Well, I asked if under the present laws one missionary was not protected who might be protected by some slight modification, which was the best, to slack up on the interpretation of exclusion, creating prejudice against the American missionaries and the American merchants in China, or would it not be better for a few Chinese laborers to get in here who really ought not to come under the law than to have the missionaries slaughtered and American trade destroyed? That

phase of the question did not seem to interest those who are making themselves partisans of the labor union bill, but on the contrary, all hands agreeing that we do not want cheap Chinese labor in this country, the sole proposition was, "We have got to be extremely exacting or a few will get in." We have got to modify the method of execution of the law. I think most people quite concur that the commercial interests of the United States have stood still while the extreme element of the labor interests have been very aggressive in fighting the admission of Chinese into this country to the extent of keeping out Chinamen who had a right to come here under the treaty, and that really nothing would be necessary except the change in the administrative measures. If four or five of these fellows who are making such strenuous regulations and so strenuously interfering with the rights of Chinamen who have a right to come to this country were put out of office and some more liberal-minded people put in, I believe Chinese immigration could be handled very satisfactorily under the present law, both to China and to ourselves. But there are some measures which the President proposed which I believe would be advantageous to have put into the statutes, and the chiefest of these is that Chinamen coming to this couutry shall get certificates from American counsuls in China and that the certificates shall be prima facie and final evidence that the man is entitled to enter and the customs authorities will then be forbidden from any interference at all. I do not see why that should not be done. But our friends from California and the representatives of labor unions who are opposing the admission of Chinese think that certificates could be bought over there. They refer to one case where a trade was carried on in certificates purchased from an American consul, I think at seven dollars apiece. He and some Chinese mandarin or other officer made a deal by which they furnished certificates to Chinamen coming to this country. The advocates of the strenuous elimination of Chinamen from this country said "What are you going to do about a case like that?" Mr. ROOSEVELT said, that is the easiest case imaginable to man-

age. Just discharge that consul and put an honest man in his place. There is no more likelihood of all consuls or any considerable number of them being dishonest than there is of the management of the custom house being dishonest. If we undertake any recommendation to Congress at all, I believe we ought to recommend the Foster bill. Mr. FOSTER, who represents a district in Vermont, has gone over this subject very fully with the members of the American Asiatic Association, who are fully posted on the subject, and he has made the provisions that the President recommend in the way of requiring consuls abroad to give certificates and to be careful about giving certificates and then requiring the custom house authorities to accept those certificates. The matter of these Chinamen who were detained here seems to me an insignificant matter. They were kept over night at the custom house in Boston. There is no justification for their attitude of antagonism on account of a thing like that except principle, because I have no doubt they lived better that night than they ever lived in their lives, so far as housing was concerned; and the indignity, if it was an indignity, does not approximately compare with the injury they have done us by having the throats of our missionaries in China cut, and they have no grievance against us compared with what we have against them. If we once treat them fairly I believe the government ought to take hold of it and make them treat us right, our commerce and our missionaries both. In the matter of the exclusion of coolies I am with the trades unions and I do not see why they should undertake to become partisans when practically every manufacturer in the United States is with them on that. It is pretty nearly a unanimous proposition that we do not want this country overwhelmed with cheap labor of people of a different race from ours. We have had two elaborate experiences with colored races so far and we have not gotten out of either of them with any degree of satisfaction—the red man and the black man—and for myself I do not want any other race experiment in this country. I would exclude the cooley Chinamen on that score alone and nothing else. But as a matter of political

economy it is all right for us to exclude him. We have a treaty with China that we shall exclude him if we want to, and that treaty entitles us to free and open commerce with China and protection for our missionaries. I believe we ought to admit Chinamen who have a right to come here without any interfence or indignity of any kind and that we ought to insist on the observance of that treaty, the exclusion end, the commerce end and the protection of missionaries end. [Applause.] And I believe we will do it if we get the right law.

The PRESIDENT. Mr. Secretary, may I ask you to read the resolution again?

The Secretary read the resolution.

Mr. DANIEL A. TOMPKINS. Mr. President, I do not know whether the members here would feel sufficiently familiar with the terms of the Foster bill to justify recommending the Foster bill in particular. It has the cordial support of the whole American-Asiatic Association and of most of the people who have given special study to this subject. It is better for us to do something specific if we can than to talk in general terms. I would not ask anybody to vote for the amendment who did not feel that he knew enough about it to do so, but I move the amendment that we recommend the Foster bill now pending in Congress for passage.

The PRESIDENT. I think the resolution does recommend it, Mr. TOMPKINS.

Mr. DANIEL A. TOMPKINS. The Foster bill specifically?

The PRESIDENT. Yes.

Mr. DANIEL A. TOMPKINS. Oh, yes.

The PRESIDENT. Will you be kind enough to read the resolution again, Mr. Secretary.

The Secretary read the resolution.

Mr. DANIEL A. TOMPKINS. I beg pardon; I misunderstood you.

The PRESIDENT. Are there any further remarks on this resolution?

There being no further remarks, the resolution was put to vote and declared unanimously adopted.

COMMITTEE ON CROP REPORTS.

Mr. GEORGE A. AYER. A resolution regarding crop reports.

Resolved, that the President of the Association be authorized to appoint (subject to the approval of the Board of Government) a committee on crop reports, which committe shall have power to act for the Association in endeavoring to secure such changes in government crop reports as would be for the best interests of the cotton manufacturing industry.

The resolution was seconded by Mr. CHARLES H. FISH.

The PRESIDENT. Are there any remarks?

Mr. WALTER E. PARKER. Is this a permanent committee?

The PRESIDENT. It is not exactly stated, Mr. PARKER, whether it would be or not. It would be a committee probably for this year. Any suggestion will be in order.

Mr. DANIEL A. TOMPKINS. Let it be appointed and it can be discharged or maintained as the Association sees fit.

Mr. WALTER E. PARKER. Mr. President, I think we all recognize the need of better crop reports than we have had and we all recognize the need of getting something more accurate and more reliable. For this Association to nominate here today a permanent committee or a committee that shall be con-

sidered permanent, perhaps, is a doubtful expedient. I supposed that the resolution that was to be offered contemplated appointing a committee to attend a meeting to be held very soon in Washington, and if that is what is contemplated I shall be in favor of the resolution. I would like to know a little more about it if the other course is contemplated.

The PRESIDENT. Perhaps I can explain to Mr. PARKER that delegates have been appointed to the meeting in Washington on May 1 and the Secretary will announce their names later in the meeting. This committee has nothing to do with the May 1 convention, but was for the purpose of considering the whole question of crop reports and acting for the Association. There is a general feeling that our Association should take some action and take the lead in determining what is wanted by the manufacturers, and the only way to do that seems to be through a committee carefully selected of the best men we can find in the Association for that purpose. The object of the resolution is to create such a committee without any definite time being stated for its duration.

There being no further remarks the resolution was put to vote and was adopted unanimously.

COMMITTEE ON TARIFF LAWS.

Mr. GEORGE A. AYER. One more resolution.

Resolved, that the President of the Association be authorized to appoint (subject to the approval of the Board of Government) a committee on tariff laws as affecting cotton manufacturing.

The resolution was seconded by Mr. J. R. MONTGOMERY and being put to vote was declared unanimously adopted.

The following paper was read:

Weights and Measure applied to Textile Numbering.

GEORGE MOORES, F. S. S., 25 Victoria Street, London, S. W., England.

Discussed by Messrs. ARNOLD B. SANFORD and C. J. H. WOODBURY.

ELECTION OF OFFICERS.

Mr. CHARLES H. FISH. Mr. President, the Committee on Nominations reports the following candidates to fill the several offices.

PRESIDENT.

JAMES R. MACCOLL, PROVIDENCE, R. I.

VICE-PRESIDENTS.

WILLIAM D. HARTSHORNE, LAWRENCE, MASS.
GEORGE A. AYER, EASTHAMPTON, MASS.

DIRECTORS FOR THREE YEARS.

GEORGE P. GRANT, JR., FITCHBURG, MASS.
FRANKLIN W. HOBBS, BOSTON, MASS.
GEORGE OTIS DRAPER, HOPEDALE, MASS.

DIRECTOR FOR TWO YEARS.

ROBERT BEATTY, PHILADELPHIA, PA.

DIRECTOR FOR ONE YEAR.

HENRY F. MANSFIELD, UTICA, N. Y.

On motion duly seconded it was voted that the report be accepted, and that the Association proceed to ballot.

The PRESIDENT. The Chair will appoint Messrs. J. R. MONTGOMERY, C. P. BROOKS, SIDNEY D. PAINE and SIMON FRIEDBERGER a committee to distribute, collect and count the ballots. Have all voted who wish? If so, I declare the polls closed.

The committee proceeded to the discharge of their duty.

The following papers were read:

Reinforced Concrete applied to Factory Construction.
ROBERT A. CUMMINGS, Pittsburgh, Pa.

Discussed by Messrs. CHARLES H. FISH, HENRY P. GREG, LOUIS SIMPSON, ERNEST L. HERSON, WILLIAM W. CROSBY and WILLIAM D. HARTSHORNE.

Belt Creep.
W. W. BIRD, Worcester, Mass.

Discussed by Messrs. CHARLES F. CHASE and THOMAS HENRY SMITH.

Mechanical Stokers.
ELWOOD E. TAYLOR, Boston, Mass.

Discussed by Mr. GEORGE P. GRANT, Jr.

DELEGATES TO CONFERENCE OF COTTON GROWERS AND MANUFACTURERS.

The PRESIDENT. The Secretary will please announce the names of the delegates to the Conference of Growers and Manufacturers of Cotton in Washington on May 1 and 2.

The Secretary read as follows.

Delegates to Conference of Cotton Growers and Manufacturers, Washington, D. C., May 1 and 2, 1906, at the New Williard: JAMES R. MACCOLL, *President*, Providence, R. I.; WILLIAM D. HARTSHORNE, Lawrence, Mass; CHARLES B. AMORY, Boston, Mass.; STEPHEN A. KNIGHT, Providence, R. I.; WILLIAM C. LOVERING, Taunton, Mass.; J. R. MONTGOMERY, Windsor Locks, Conn.; C. J. H. WOODBURY, *Secretary*, Lynn, Mass.

RESOLUTION OF THANKS.

The SECRETARY. The Committee on meetings have asked for the presentation of the following resolution of thanks.

Resolved, That the New England Cotton Manufacturers' Association extends its hearty thanks to the gentlemen named below for the interst-ing and valuable papers presented at the Eightieth meeting of the Association: that the members wish to express their appreciation of the presence at this meeting of the gentlemen named and the sacrifices made by them in the careful preparation of their contributions: that a copy of these resolutions be sent by the Secretary to Messrs. FREDERICK P. FISH, EDWIN NEVILLE VOSE, H. W. MACALISTER, C. A. GREEN, F. P. BENNET, Jr., GEORGE MOORES, F. S. S., ROBERT A. CUMMINGS, C. E. and Prof. W. W. BIRD.

TO THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY for its renewal of cordial hospitality in according this Association an opportunity to hold a meeting in Huntington Hall, we extend our thanks; and we avail ourselves of this opportunity to place on our records a testimonial to the value of the instruction given by this Institution.

TO THE AMERICAN TELEPHONE AND TELEGRAPH COMPANY, the thanks of the New England Cotton Manufacturers' Association are tendered for its courtesy in affording the privilege of complimentary long distance telephone service to members attending the Eightieth Meeting of the Association.

The long distance telephone has established itself as a valuable adjunct to textile manufacturers by bringing mills in direct relations with markets, by an instantaneous service which enables the consummation of commercial transactions with the delays of travel or those inherent with other methods of communication.

TO THE NEW ENGLAND TELEPHONE AND TELEGRAPH COMPANY, the thanks of the New England Cotton Manufacturers' Association for the courtesies of service placed at the disposal of the members during this meeting.

The telephone has been a most efficient, economic factor in the management of cotton manufacturing establishments as well as the conduct of the commercial affairs of the industry.

On motion of Mr. GEORGE P. GRANT, Jr., duly seconded, the resolutions were unanimously adopted.

ELECTION OF OFFICERS.

The Committee on counting ballots for officers report. Whole number of ballots, 98. Necessary for a choice, 50.

PRESIDENT.

JAMES R. MACCOLL, PROVIDENCE, R. I. Received 98.

VICE PRESIDENTS.

WILLIAM D. HARTSHORNE, LAWRENCE, MASS. Received 98.
GEORGE A. AYER, EASTHAMPTON, MASS. Received 98.

DIRECTORS FOR THREE YEARS.

GEORGE P. GRANT, JR., FITCHBURG, MASS. Received, 98.
FRANKLIN W. HOBBS, BOSTON, MASS. Received 98.
GEORGE OTIS DRAPER, HOPEDALE, MASS. Received 98.

DIRECTOR FOR TWO YEARS.

ROBERT BEATTY, PHILADELPHIA, PA. Received 98.

DIRECTOR FOR ONE YEAR.

HENRY F. MANSFIELD, UTICA, N. Y. Received 98.

J. R. MONTGOMERY,
C. P. BROOKS,
SIMON FRIEDBERGER,
SIDNEY B. PAINE,
Committee.

The SECRETARY. By request of the President I declare that these persons have been duly elected by ballot for the various offices and for the terms as named.

The PRESIDENT. I thank you for electing me again to the office of President. I shall endeavor to serve you to the best of

my ability and I trust that the Association, under the direction of the enlarged Board of Government will be of increasing usefulness to the important industry which we represent. [Applause.]

If there is no other business, I presume we shall now adjourn the meeting, although there is a dinner by the Association this evening, in honor of the Lancashire Private Cotton Investigation Commission.

On motion of Mr. WILLIAM D. HARTSHORNE, the meeting thereupon voted to adjourn, at six minutes before one P. M.

Adjourned.

Attest:

C. J. H. WOODBURY,
Secretary.

TRANSACTIONS.

FIRST SESSION.

WEDNESDAY MORNING, APRIL 25, 1906.

The Association met in Huntington Hall at 11 A. M., President MACCOLL in the chair.

The PRESIDENT. The first paper on the programme is by one of our members now living abroad, which the Secretary will present in the absence of the author. The Influence of Humidity, Temperature and Lubrication, by WILLIAM F. PARISH, Jr., of Berlin.

THE INFLUENCE OF HUMIDITY, TEMPERATURE AND LUBRICATION UPON THE POWER OF TEXTILE MILLS.

WILLIAM F. PARISH, Jr., Reichstagsufer 16. Berlin, N. W. 7, Germany.

In making á study of power to ascertain the value of many variables, and especially to record the effects of lubrication, it was early appreciated that a textile mill afforded the best opportunity for following out and checking the many influences upon power. Among general practising engineers, when the subject is discussed, it is considered that the textile mill problem presents no very great complexity and even the men most intimately connected with the business consider that the power of a mill is a uniform and uninteresting one, influenced only by the number and adjustment of the machines at work, but affected in some mysterious way on Monday morning. I have rarely found a man who was not surprised at the charted or plotted result of an all-day indicator test made upon the average mill. While a mill load does not fluctuate as a load does on on a tram car line, or on a small machine shop, or on a large rolling mill engine, it does vary much more than the general mill engineer will credit. Increases in driving power are sometimes made that require other and more expensive changes before the load can be properly carried, whilst if the influences which I am about to describe were considered, the original installation would be sufficient for the work.

All the figures which I have obtained and recorded have come from mills where the material manufactured was similar as possible during the two periods in which the observations were taken. This was necessary, the tests were being made for comparative information, and therefore it was essential to hold all governable factors a constant, and note the effect of any one changed.

In the following examples a selection has been made of records that clearly show the influences of the various subjects I have taken for this paper. In every case the work or machinery load is governed and held a constant, and the power is affected only by the cause assigned.

When reference is made to the "power of a mill," the expression is taken to mean the "all-day power" as shown by a chart line made up from indicator cards taken at frequent intervals. "Average horse power" is the average of all these cards. "Variables" are intended to mean the rise and fall of the power caused by the operation of the machinery load, and through effects of temperature, humidity and lubrication.

One of the great influencing factors upon the power of a mill is temperature. It is the temperature that causes a mill to start up hard in the morning, especially on Monday. I know of an extreme case where it took the engineer at one boiler, the fireman at another, and the manager at the third to keep the engine going for the beginning of each day. The reason was supposed to be that the engine was not powerful enough. The real reason was, improper lubrication, largely affected by temperature, with the further influence of relative humidity. The effect of temperature will always be felt more if a mill is being lubricated improperly. The main reason why it is felt at all is through its action upon the lubricant. Humidity affects the belts or straps and more especially the cotton bands; its action upon the belts being just the reverse of that upon the bands, so much so that in many mills the power of the engine is not affected, as the tightening of the spindle bands offsets the loosening of the leather belts or straps. Were it not for the counter-action of

the driving belts, humidity would affect the speed of the spindles, and an increase of humidity would result in an increase of speed, as the bands would be tighter and would slip less. The power, however, would be increased by the extra pressure on the bolsters, and by the higher rotative speed of the spindles, assuming, of course, that all other conditions were equal.

The speed of the spindles is affected through lubrication, the revolutions increasing as the resistance decreases, because of lessened band slippage at the whorl, or warve. When a good percentage of power is saved through the better lubrication of spindles, the lessened resistance of the frames reduces the slips of the belt from main shaft to frame. The speed therefore increases, the power concurrently being reduced so that a decreased resistance in spindle bearings, —

(1) Decreases the power,
(2) Decreases the temperature due to friction, and
(3) Increases the speed of the spindle by reducing the slip of driving band.

The temperature affects the power through the lubricant, as the following hypothesis will show: —

A mill with 1,000 horse power and a poor lubricant might require up to 1,300 horse power to start in the morning when the lubricant was cold, because when a poor lubricant possesses little fluidity, an increased fluidity of a poor oil can only be obtained by increasing its temperature, which must come from the friction of the oil working in the bearings. No abrasive friction is caused as the actual bearing surfaces are farthest apart when the lubricant is cold. The heat from the spindle or bearing is the result of oil friction only, which increases the fluidity of the oil, increasing its ease of operation, and reducing the amount of power necessary to operate the mill. The increased temperature of the bearings gradually has its effect upon the temperature of the room, upon the relative humidity, and also finally upon the power.

Upon a single ring spinning frame the effect of humidity far out-values that of temperature. Chart No. 1 is taken from a series of tests upon a frame of old Sawyer spindles, which are lubricated similarly to mule spindles. A test was being made where temperature readings were taken every fifteen minutes from 7 A. M. until 4.45 P. M. The thermometers and hygrometers were placed beside the frame, which was an outside one, and near two windows overlooking a field. At 9 o'clock read-

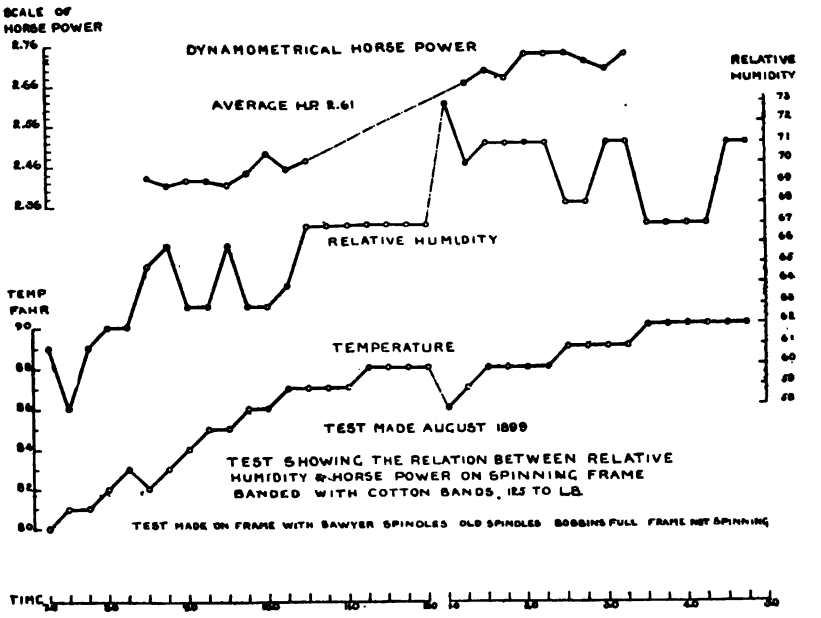

SCALE OF HORSE POWER
DYNAMOMETRICAL HORSE POWER
AVERAGE H.P. 2.61
RELATIVE HUMIDITY
RELATIVE HUMIDITY
TEMP FAHR
TEMPERATURE
TEST MADE AUGUST 1899
TEST SHOWING THE RELATION BETWEEN RELATIVE HUMIDITY & HORSE POWER ON SPINNING FRAME BANDED WITH COTTON BANDS, 12S TO LB.
TEST MADE ON FRAME WITH SAWYER SPINDLES OLD SPINDLES BOBBINS FULL FRAME NOT SPINNING
TIME

CHART No. 1.

ings were started on a dynamometer for measuring the amount of horse power consumed by the frame. These readings were taken every fifteen minutes, with the spindles running empty, and with top rolls and traverse motion on. The day was one of those known in America as "dog days" which occur in August, and during which peculiar feats are performed by both the temperature and the relative humidity. On this particular day the temperature was 80 degrees fahrenheit in the room at 7 A. M., rising gradually until at 3.30 P. M. it reached 90 degrees

where it stayed for the balance of the test. The relative humidity started at 61 per cent., at 7 o'clock, dropped to 58 per cent. in fifteen minutes, and during the next interval rose to 61 per cent., afterwards increasing with several lapses to 71 per cent., where it was at 4.45 P. M. when the test finished. A test showing the relative humidity increasing during the day with an increase of temperature was peculiar enough, but we were delighted to find that the horse power shown from our readings of the dynamometer also increased, from 2.43 horse power at 8.15 A. M. to 2.47 horse power at 10.15 A. M., and in the afternoon the same frame in the same condition indicated 2.66 horse power at 1 P. M. and 2.73 horse power at 3 P. M.

	Per cent.
Temperature increased,	12.5
Relative humidity increased,	13.0
Power increased,	8.2

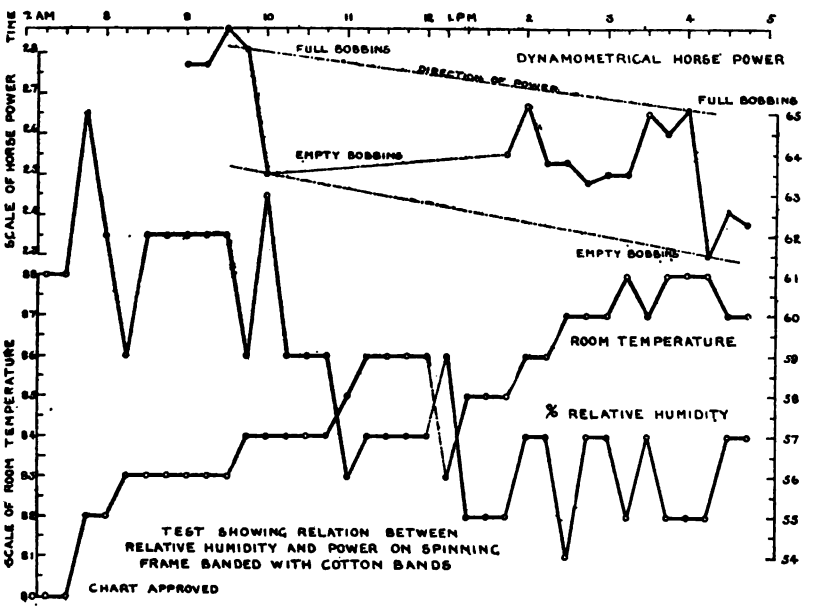


CHART No. 2.

Readings, taken several days later on the same test, gave opposite results, when charted. On this occasion the weather

conditions were what was ordinarily recorded. The temperature started at 7 A. M. at 80 degrees fahrenheit increasing by jumps to 86 degrees at noon, and dropping three degrees during the noon hour, which is usual, then going up to 88 degrees at 4.15 P. M., falling one degree at 4.30 P. M. The humidity starts at 61 per cent., jumps to 65 per cent., settles back to 59 per cent., and stays at 62 per cent. for over an hour, gradually decreasing in wavering jumps until it reaches 55 per cent. at 4 o'clock, finishing at 57 per cent., as will be seen on Chart No. 2.

The frame was spinning during the test, but there are four points where it is in comparable condition, just before and after doffing, or on full and empty bobbins.

The empty bobbin condition is the best for comparison. The power at 10 o'clock in the morning, bobbins empty, was 2.50 horse power and at 4.15 in the afternoon, with bobbins in the same condition, was 2.30 horse power.

	Per cent.
Temperature increased,	10.0
Relative humidity decreased,	7.0
Horse power decreased,	8.7

Comparing the two tests which were made on the same machine with the same instruments and men, the results are as follows: —

Temperature increase can be considered as being practically the same in both cases.

Humidity in one case increased 13 per cent., with the result that the horse power shows an increase of 8.2 per cent. In the other case the humidity decreased 7 per cent. and the horse power shows a decrease of 8 per cent., proving quite graphically that on this one frame the power was closely related to the relative humidity, and would vary with it in nearly the same ratio, assuming the temperature to gradually increase during each day.

Some time after, when I was trying to secure some data, along the same line, a test which was being conducted on a large textile plant opened up great possibilities, as one engine of 1,000 horse power was driving ring spinning alone, and cards on this engine

were to be taken from 8 A. M. until 5 P. M. of each day of test. Arrangements were made to take temperature and relative humidity day and night during the week, readings being taken every hour (Chart No 3). The first two days of test were clear and bright, and there appeared little opportunity for noting the workings of a variable factor; fortunately it rained the next day,

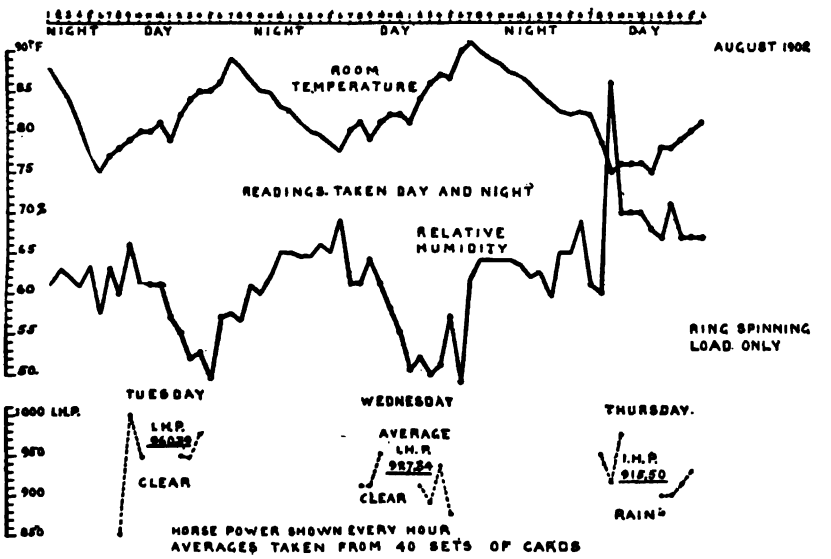


CHART No. 3

but after the results were worked out and charted, it was found that the effect was exactly opposite to what would be expected under these conditions. The temperature and relative humidity for the nights preceding the first two days were about the same: —

FIRST DAY.	Per cent.
Temperature increased,	10.4
Relative humidity decreased,	11.0
Horse power increased,	14.8

Horse-power readings varied 20 per cent. during the day.

SECOND DAY.	Per cent.
Temperature increased,	12.5
Relative humidity decreased,	10.0

The horse power varied 15.8 per cent. during the test, but was the same at the end of the day as at the beginning.

THIRD DAY.	Per cent.
Temperature increased,	6.5
Relative humidity decreased,	2.0

Horse power was the same at the beginning as at the end of the day, but varied 10.9 per cent. during the run.

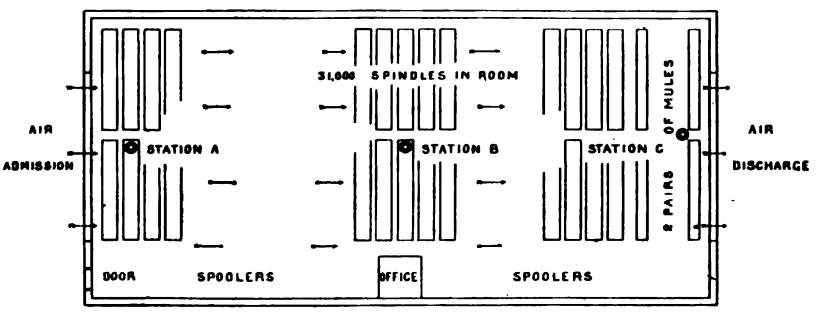
The main reason for surprise was in the fact that comparing the first and last days, the results were as follows: —

	Per cent.
Temperature decreased,	5.6
Humidity increased,	12.1
Horse power decreased,	5.0

This is exactly opposite to what the opinion of mill men and all of our previous experience would lead us to believe. The 480 cards taken during the three days of test were carefully checked, and the areas were found to compare exactly with the admission, pressure, and point of cut-off. This last observation was the one that allowed us to solve the difficulty. The engine was well loaded, the main driving belt not being sufficiently large to carry more than an ordinary load on a normal day, and the increase of relative humidity of 12.1 per cent. added to the power required by the spinning frames so that the belt slip increased to such a point that the engine did not transmit over 95 per cent. of the power it would have given under normal conditions.

One of the most exhaustive mill tests probably ever conducted was made on a mill having an oblong spinning room containing 31,000 ring spindles; the method of ventilating this room was by blowing air in one end and exhausting from the other. The air was heated and charged with the necessary amount

of moisture at the entrance. The room was practically sealed, as the windows were double and did not open. During an inspection I noticed that at the end of the room where the air entered the heaviest counts were spun. As one walked down the room the temperature increased perceptibly, and the yarn spun became finer, until at the end of the room the temperature was so high that two pairs of mules were in operation on very fine counts. The problem was interesting. The temperature of the room was controlled by the temperature of the spindle bases, and the relative humidity was determined by the temperature of the room. I was under the impression that there was a loss of about 13 per cent. by using the oil then in the spindle bases. This loss represented heat, which was quite in evidence even by a casual examination.



EACH STATION CONSISTED OF HYGROMETER, AIR THERMOMETER, YARN SCALE, AND SPINDLE BASE THERMOMETERS.

PLAN OF SPINNING ROOM

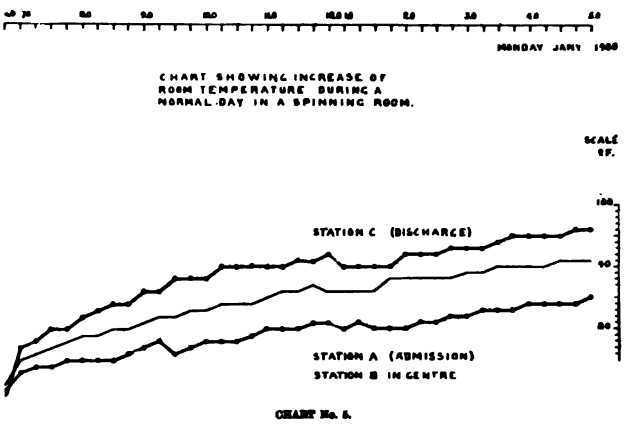
PLAN No. 4.

Changing to an efficient lubricant and reducing the power, would reduce the heat of friction, would reduce the difference in the rise of temperature of the room between the admission and the exhaust, and would also affect the relative humidity. This test required seven men to read instruments which were placed at three different stations in the room. Thermometers and hygrometers, with a yarn balance scale, to see how much moisture 100 grammes of bone dry cotton would absorb, and the spindle rail thermometers were placed at each station. Readings

were taken every fifteen minutes, from 6 A. M. to 5 P. M. for five days during each week of the test, and Chart No. 5 will show the readings of room temperature of the day selected for this discussion, all readings starting at 6 A. M. before the mill was opened, at practically the same point. Station A was the admission air end, station B in centre, and station C was at exhaust or far end, as shown by plan No. 4.

Temperatures on stations A and C, or the two ends of the room on the day charted, were as follows: — (Chart No. 5.)

A 6 A. M. 70° F. 5 P. M. 85° F. Increase 15° or 21.4 per cent.
C 6 A. M. 69° F. 5 P. M. 96° F. Increase 27° or 39.0 per cent.
A increases 15°, C increases 27° or 12° F. more (80 per cent.).



C increases 80 per cent. more than A, due to the combined heat thrown off by the machinery.

Spindle base temperature. (Chart No. 6.)

A 6 A. M. 69° F. 5 P. M. 96° F. Increase 27° or 39 per cent.
C 6 A. M. 69° F. 5 P. M. 105° F. Increase 36° or 52 per cent.
A increases 27°, C increases 36°, or 9° F. more (33 per cent.)

C increases 33 per cent., due to increase of room temperature caused by frictional heat.

The reduction of ratio of rise between room and spindle temperature is caused by the increased fluidity of the oil at the warmest or C station, due to the increased temperature of the room; this temperature in turn coming from the spindles.

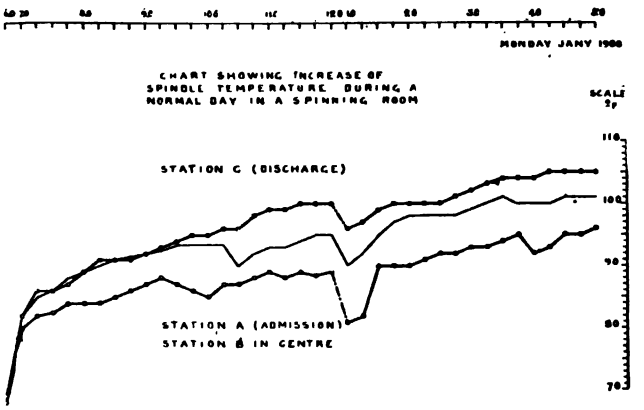


CHART SHOWING INCREASE OF SPINDLE TEMPERATURE DURING A NORMAL DAY IN A SPINNING ROOM
STATION C (DISCHARGE)
STATION A (ADMISSION)
STATION B IN CENTRE

CHART No. 6

Rise or actual temperature of spindles, due to friction at the end of the day's test (5 P. M. readings):—

Spindle at A room 85°, Spindle 96°, rise 11° or 13 per cent.
Spindle at C room 96°, Spindle 105°, rise 9° or 9 per cent.

Increased temperature at A caused by oil working at a lower surrounding temperature.

RELATIVE HUMIDITY (CHART NO. 7).

On the same day of this test the relative humidity of these two stations was as follows: —

A	6 A. M. 30 per cent.	5 P. M. 36 per cent.	Increase 6 per cent.
C	6 A. M. 48 per cent.	5 P. M. 40 per cent.	Reduction 8 per cent.

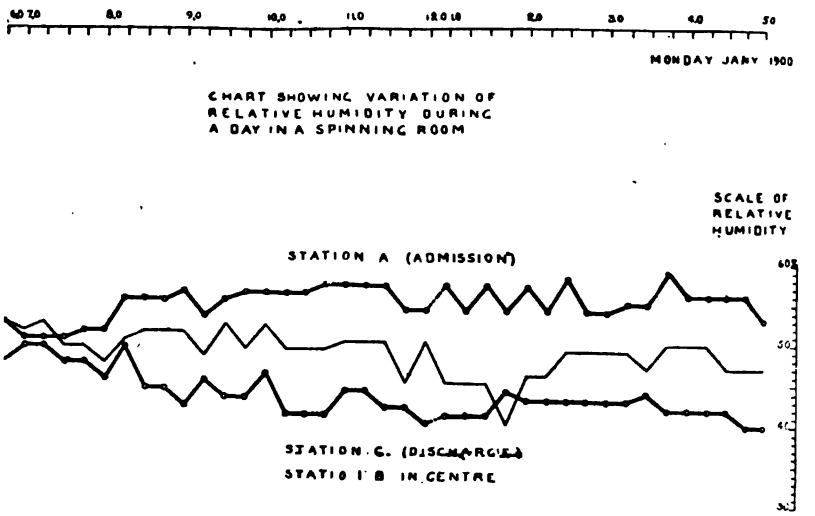


CHART No. 7.

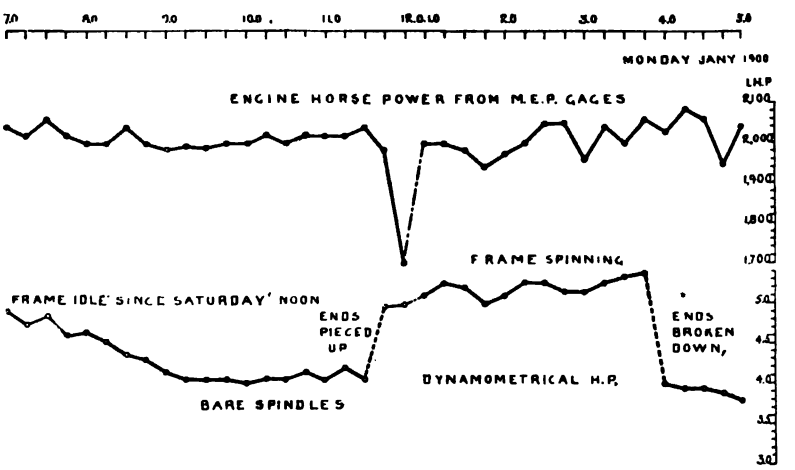


CHART No. 8.

HORSE POWER OF FRAME (CHART NO. 8.)

Frame with bare spindles starting up cold, and run all day empty: —

7 A. M. 4.8 H. P. 5 P. M. 3.7 H. P. Reduction 1.1 H. P. or 22.09 per cent.

The deductions to be be drawn from these figures are as follows: —

On a mill built and ventilated as the one in question, starting up in the morning, the temperature will increase during a normal day 15 degrees or 21.4 per cent., which is practically the natural increase in the outside temperature of the atmosphere, but under the influence of heat of friction from the spindles and machinery, the temperature will rise 27 degrees or 80 per cent. higher than the ordinary increase of the outside temperature, considering always that no influence such as draughts or counter currents of air from some uninfluenced place, are at work. This greater increase of room temperature is primarily caused by the friction in the spindle bases, and the counteracting effect is to cause the oil in the bearings and bases to become more fluid, thereby reducing the oil resistance sufficiently to allow of the spindles operating at 18.2 per cent. less frictional heat (which is the difference between the actual temperature of the spindle of the spindle bases at A and C) than would be the case if the oil remained in a temperature that was not affected by outside heat. This is checked by the horse power of the frame, which shows a decrease during the day of 23 per cent. in power from no other cause than the increased temperature of the room and spindle bases.

In this one case —

Thirty-nine per cent. increase of room temperature and 52 per cent. increase of spindle temperature with 8 per cent. reduction of relative humidity during the day causes a drop in the horse power of a spinning frame of 23 per cent., with a decrease in the temperature of the spindle bases of 18.2.

LUBRICATION AND POWER.

The comparative results of the lubrication changes made during the two tests from which the above deductions are made were —

Reduction in horse power of mill,	7 per cent.
Reduction in horse power of frame,	13.5 per cent.
Reduction in temperature of spindle bases,	28.2 per cent.
Reduction in room temperature C over A,	7° F.
Increase relative humidity C over A,	4 per cent.
Increase speed of spindles,	221 r. p. m.

Rain outside both days of test on which comparisons were made.

An interesting test was made and reported upon in the transactions of the American Society of Mechanical Engineers, Vol. XXIV., upon a ring spinning frame containing 288 spindles, ¾-inch whorl or warve, 7-inch cylinder or tin roller, 14-inch driving pulley, 1⅜-inch ring, 17/0 traveller, and 5½ inch lift, working under the following conditions: —

40's weft.
27.5 pounds weight 288 full bobbins.
14 pounds weight 288 empty bobbins.
13.5 pounds yarn to full frame.
90 bands to the pound.
2.31 pounds average band pull.

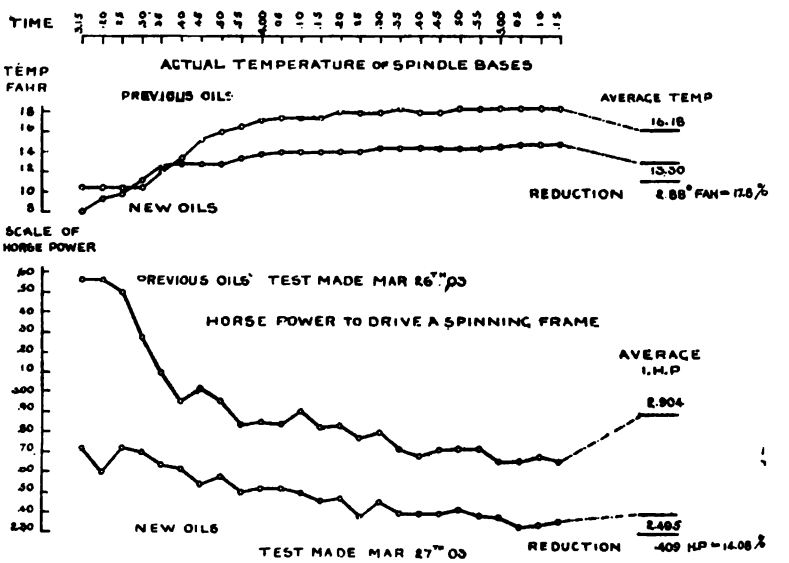


CHART No. 9.

The test, as shown on Chart No. 9, was under bare spindles and made identical as far as the conditions of the frames were concerned, the oil only being different. Spindle bases were cleaned out with gasoline before each test, and fresh oil was put

in. The frame was started and readings were taken; immediately it got up to speed, and continued every five minutes.

A special thermometer having a spiral bulb was put round the end of the spindle base and an Emerson dynamometer was used for horse power readings, in connection with a Guggenheim tachoscope, and Horn's and Schäffer and Budenberg tachometer for speed.

The frame with the poor oil required 3.56 horse power for the first reading with everything cold, and in forty minutes this had fallen to 2.82 horse power, or 20.8 per cent. The actual heat of spindle base above the room temperature increased from 10.5 degrees to 16.5 degrees or 60 per cent. The two hour tests showed between the first and last readings, on the poor oil, as follows: —

Decrease of Power,	3.56 H. P. to 2.68 H. P. or 24.8 per cent.
Increase of Temperature,	10.5° to 18.5° or 8° Fahrenheit.

With the best oil the difference between the first and last readings of the two hour test was: —

Decrease of Power,	2.72 H. P. to 2.34 H. P. or 13.8 per cent.
Increase of Temperature,	8° to 15° or 7° Fahrenheit.

The practical value of the test shows in the amount of power a good lubricant will save. The average power of both tests being: —

Two hours on poor oil,	2.904 horse power.
Two hours on good oil,	2.495 horse power.
Reduction,	.409 horse power.
Or 14.08 per cent.	

Actual temperature of spindle bases shows as follows: —

Two hours on poor oil,	16.18° Fahrenheit.
Two hours on good oil,	13.30° Fahrenheit.
Reduction,	2.88° Fahrenheit.
Or 17.8 per cent.	

The influence of temperature and lubrication upon the power of a single machine, while interesting and conclusive as far as that certain machine is concerned, does not possess the same value or interest as a big test upon a complete mill, and it will be my pleasure to give in full a report upon a comparative test in two woollen mills; the lubrication of both being same before and after the change was made, the reduction on one mill checking the reduction on the other.

COMPARATIVE MILL TEST.

The purpose of this series of efficiency tests was to show in a practical manner that it was possible to secure a reduction of the total horse power required to drive the mills, by changing from the old oils in use (which were of good quality for their kind) to new oils which were manufactured especially to contain a maximum amount of lubricating nature.

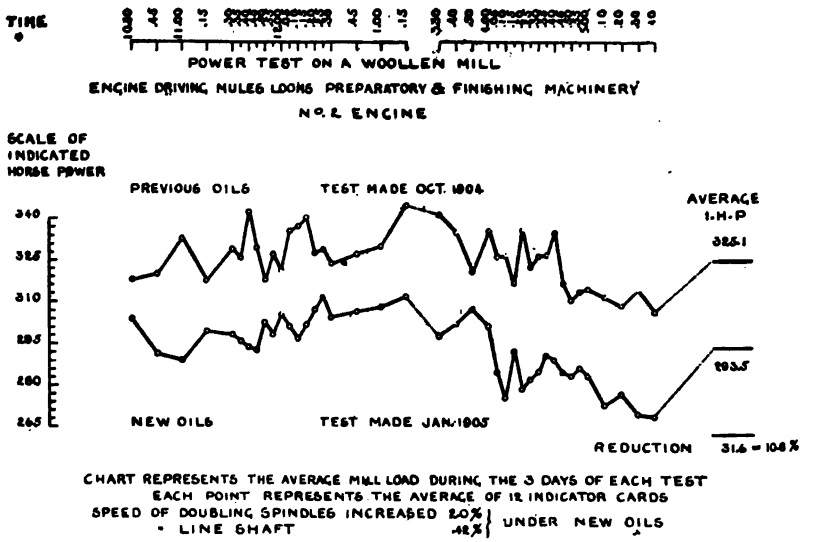


CHART No. 10.

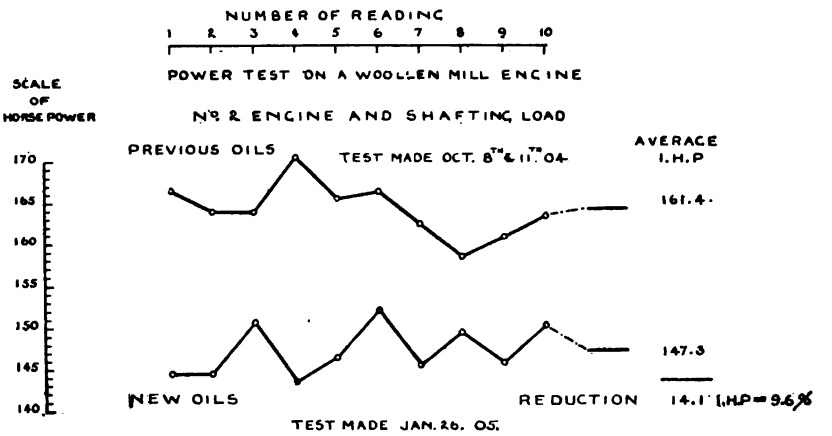
PLANT.

The mills were generally driven by a water-wheel and two engines. For convenience during the trials, the smaller engine

was called No. 1, and the larger No. 2. The water-wheel was stopped during both sets of trials, and No. 2 engine was coupled up to take the additional load.

ENGINE NO. 1. — Made by Hicks, Hargreaves, Limited, Bolton. Horizontal tandem compound, Corliss valves, cylinders 13-inch and 24-inch by 36-inch stroke, 83 revolutions per minute, 120 pounds steam, horse power about 250.

ENGINE NO. 2. — This engine drives the spinning, carding, and dye-house machinery. Built by Hicks, Hargreaves, Limited, Bolton. Same type as No. 1, cylinders 18-inch and 33-inch by 40-inch stroke, 74 revolutions per minute, 120 pounds steam, and horse power about 400.



EACH POINT ON TOP LINE REPRESENTS 8 INDICATOR CARDS
BOTTOM 4

CHART No. 11.

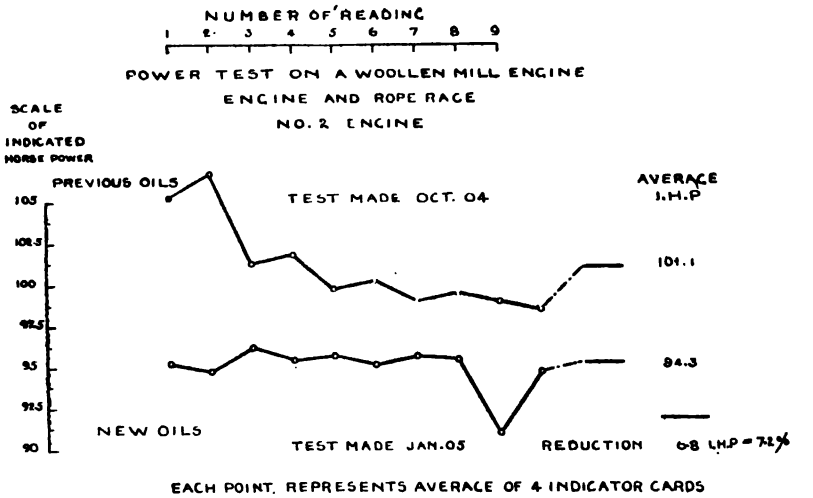
GENERAL PLAN OF TEST.

In order to secure a proper basis for the reduction work, a complete series of tests were taken, one week being given for each engine. These first tests were in October, 1904, and the operations were conducted on Tuesday, Wednesday, and Thursday, these being average days, away from week end influences.

Indications for the total power were taken on each of the three days, from 10.30 A. M. to 5.40 P. M., at intervals arranged to secure an average load, forty sets of cards being taken every day, or 160 cards on the full load, making 480 cards a week for each engine on mill load only. Extra tests were taken at noon and night for shafting and sub-divisional loads, an extra set of tests being made upon No. 2 engine to furnish information for the mill regarding the power of various departments, and to secure the values of various changes, outside of the question of lubrication.

During these trials speeds were being taken of various marked spindles, and of line and counter shafting, as well as a complete record of relative humidity and temperature.

After a basis had been secured, the new oils were placed throughout the plant. No special cleaning was done previous to their introduction, the new oils finding their own base and doing their own cleaning.



EACH POINT REPRESENTS AVERAGE OF 4 INDICATOR CARDS

CHART No. 12.

The second or comparative tests were taken in January, 1905. After the new oils had been in use about two months, all conditions being identical, duplicate readings were taken, using the same schedules, instruments and men.

INSTRUMENTS.

Four Crosby indicators were used on each test, an indicator being fitted to each end of each cylinder. These indicators had Sargent's electro-magnets attached, and were wired up in series so that cards off all four indicators could be taken simultaneously, by simply throwing in a switch.

Each engine was fitted with a reducing motion, which only required the attachment of a quadrant to make it perfect. A six-point revolution counter was also attached.

Cards were worked out by Amsler's No. 6 planimetre, and carefully checked, and the horse power was worked out with Keuffel and Esser's 20-inch slide rule. All log sheets were self-checking. Speeds were taken with Horn's tachometer (made by Thomas & Sons, Manchester), and Guggenheim tachoscope (Balé, Switzerland), temperature and humidity by Casartelli's (Manchester) thermometers and hygrophants. All diagrams and readings have been taken, logged, and checked by expert engineers, who make comparative testing a business.

RESULTS.

The final results are all placed under the heading "Summary"; leading up to the summary are averages of all the various sections of the test, with each correction to bring it to a comparable machinery basis. Methods of securing corrections are also shown in detail, the readings having been taken by men in each division of the mill. Full detailed sheets of all readings are given. The sub-divisional test readings are given in detail, though no deductions are drawn.

The complete series of tests required the services of six expert engineers, and the following report is made from the averages of 2,840 indicator cards, each one having been checked by three different operators. One operator was also employed constantly taking speeds and atmospheric conditions, while the machinery condition was reported upon twice a day by observers in each department.

The schedules at the beginning of the report will furnish an

index to the detail sheets. Each section of the test is called by a separate letter. The comparative section, on that condition, and engine has the letter doubled, as Mill Load old oil, set A, Mill Load new oil, set AA.

Permission has been given by the mill authorities for the publication of this report.

SUMMARY OF THE ADVANTAGES GAINED BY THE USE OF THE NEW OILS.

No. 1 Engine.	Per cent.
Reduction on the Full Load,	8.0
Reduction on the Engine and Shafting Load,	10.2
Increase in the Speed of Mule Spindles,	1.7
Increase in the Speed of Counter Shaft,	.5
No. 2 Engine.	
Reduction on the Full Load, *(Chart No. 10.)*	10.8
Reduction on the Engine and Shafting Load, *(Chart No. 11.)*	9.6
Reduction on Engine and Rope Race, *(Chart No. 12.)*	7.2
Increase in Speed of Doubling Spindles,	2.0
Increase in Speed of Line Shaft,	.4

AMOUNTS AND COST OF BOTH KINDS OF OILS.

4 months Old Oils—November to February—331 gals.	£18 11 5
4 months New Oils—November to February—297 gals.	18 12 10

The President. The next paper is Some Export Trade Humbugs and Fallacies, by Edwin Neville Vose, New York City, who has addressed the Association at a former meeting.

SOME EXPORT TRADE HUMBUGS AND FALLACIES.

EDWARD NEVILLE VOSE, 290 Broadway, New York City.

This is an age of exposure, of investigation, of distrust. We expose now and then a few rascals, we investigate a good many people of alleged rascality, we distrust and suspect everybody. Buy any ten-cent magazine or one-cent red-headlined daily and you can learn full particulars regarding the latest exploits of the grafters, great and small, and all about the crimes and peccadillos imputed to the nation's most trusted business men. The test question of this modern inquisition is "Where did you get it?" but as of old the accused are tried, convicted and sentenced without a hearing. It is not my purpose to join in this clamor of denunciation without cause and accusation without evidence and my little talk about humbugs will not contain any sensational exposures. You all no doubt recall the story told of the famous naturalist, LOUIS AGASSIZ, when he was engaged in class work over at Cambridge. The boys fixed up a fake insect formed of the head of one specimen, the thorax of another, legs of a third and wings of still a fourth. The boldest then advanced to the great scientist and asked him "What kind of a bug is that?" With a glance at the curiosity the Professor growled "A humbug, sir." The business man often wishes he were equally expert at detecting the humbugs that buzz into his office and seek to fly away with his dollars. These infest all lines of trade and all localities. Wall street has a good many, and your own State street I am told has one or two.

And I am sorry to say that there are a few who prey upon the manufacturers who are enterprising enough and patriotic enough to seek export trade. There are also a few theories and alleged "axioms" relative to export trade that likewise involve the element of humbuggery, being fallacious and misleading, and to these also I desire to pay my respects.

It has always seemed to me that the most contemptible and pernicious of all swindlers, save only those who prey upon the poor, are those who seek to exploit the manufacturer who is seeking foreign markets for the first time. The ambition to secure a world-wide sale of one's merchandise is in itself so praiseworthy, while the economic advantages of a foreign outlet both to that particular industry and to the nation at large are so important, that the schemers who do their best to mislead and discourage manufacturers at the very outset of their foreign trade experience certainly merit the severest penalties. So skilful, however, are these humbugs in the use of glittering generalities that commit them definitely to nothing, and so elusive are they when sought for a strict accounting, that in the eleven years during which I have had occasion to watch them I have heard of barely half a dozen arrests and I have yet to hear of a single conviction. In dealing with all of these humbugs whether great or small the simplest and most effective course is to apply the tests of ordinary business practice and ordinary commonsense to their propositions. Those that resent investigation or whose plans cannot withstand analysis and inspection should be rejected at once.

The commonest type of export trade humbug is the syndicate agent. It is by no means unusual for a group of manufacturers in closely related lines, or perhaps residing in the same city or belonging to the same club, to form a little syndicate or organization for the purpose of sending a salesman abroad to represent them all jointly. This plan is proper and entirely practicable. The humbug who seizes upon this idea reverses it. Instead of the manufacturers who form his "syndicate" working together and hiring the foreign salesman who seems to them most capable

the agent makes his own arrangements with each manufacturer separately. Instead of confining the syndicate to four or five closely related lines — such as clocks, watches, silverware and jewelry — he calls upon anybody he thinks he can get and cheerfully undertakes the representation of watches, steam engines, hair restorers and sulky plows and as many other lines as he can run across. While usually asserting that he only intends to have at most ten firms in his syndicate the agent often secures that number in a single city and then goes on for more, telling each new victim that his firm is the last one needed to complete the enterprise. As the agent has no intention of so much as attempting to secure business for his clients it is easy for him to make big promises. It is the folks who intend to keep their word who are hampered by having to keep within the prosaic limits of probability. The thing to do when such syndicate agents come around is simply to put their statements to the test, insist on knowing the name of every firm composing the syndicate, investigate the agent's credentials and antecedants, and in a word treat the whole proposition just as you would if it related to domestic trade instead of foreign. There is no hocus-pocus about export trade that prevents the ordinary rules of business and of common sense from being applied to it.

An ingenious variation on the syndicate idea is that of the species of humbug who proposes to sell the manufacturer's goods strictly on a commission basis with a small salary to cover expenses. As the salary is to be deducted from the amount of the first order and is not due if there are no orders forthcoming, the manufacturer considers himself quite safe in signing this contract and cases have even been known where men who have been victimized by the syndicate game have been victimized a second time by this clever and apparently innocent scheme. What happens, however, is this. The swindler disappears with his contract in his pocket and for a year or so no more is heard of him and he is well-nigh forgotten. Then an order is received from some distant point through his New York representative. The goods are shipped as directed, but instead

of a remittance the manufacturer receives a neat little "statement" showing that his account with his forgotten "agent" stands somewhat as follows:

To 12 months' salary at $50.00 per month, as per contract,	$600.00
To commission on sale at 10 per cent.,	60.00
Total,	$660.00
By merchandise, as per invoice,	600.00
Balance still due,	$60.00

While the cool request for another sixty dollars or so is usually ignored the manufacturer really has no redress in a case like this. The goods are beyond recovery and are of course sold before this "Statement" is ever rendered, while if the humbug were caught — which is also difficult — his "contract" would probably protect him against a criminal charge and his utter lack of resources renders a civil suit useless. The only way to avoid such expensive experiences is to act toward such propositions as toward syndicate schemes — rigidly investigate everything, and reject absolutely those that show the slightest ground for suspicion.

The very latest wrinkle in the line of export agent humbuggery was brought to my attention only a few months ago and hailed from Egypt, although I have since learned that a somewhat similar scheme has been tried elsewhere. A firm in Egypt made a contract with an American manufacturer whereby it was granted the exclusive agency of the manufacturer's goods for that country, the contract to run for two or three years unless formally terminated. As no orders were ever received the American concern decided that its agent had gone out of business or was unable to effect any sales and allowed some of its products to go to another Egyptian firm. The "exclusive agent" seems to have been waiting for this very thing to happen for he immediately pounced upon the manufacturer with a suit for 50,000 francs damages for breach of contract. The case went to the plaintiff by default and he secured the full amount demanded and costs, together with a court order authorizing

him to seize the defendant's goods or property in any part of Egypt. The result of this procedure was not so serious in point of actual loss, since the goods thus seized amounted to only a few hundred dollars in value, but this manufacturer now finds himself barred out of the Egyptian market indefinitely while his competitors may be getting a firm foothold there. The same scheme in France or Mexico or any large buying market might result in very heavy loss both in confiscated goods and in trade. It is rarely worth while to contest such cases since local courts will almost invariably favor the plaintiff and foreign lawyers are usually troublesome and expensive. It is extremely difficult to prevent a few packages of one's goods from getting into a country tied up by such an exclusive contract even when the utmost care is taken to do so since merchandise often travels by round about channels.

It is an open question in my mind if the exclusive agency for any foreign country is not a humbug, notwithstanding the fact that many eminent and unquestionably honorable firms ask for the exclusive clause in their contracts. There are certainly instances without number where exclusive agencies have been demanded by firms whose sole purpose was to keep American goods out of the country. This has very often been the case with British and German trading houses in all parts of the world, their object being, of course, to hold the market for the manufacturers of their own country or for lines in which they secure exceptional rebates. It is advisable in making all contracts with foreign agents or agencies, and most especially in the case of exclusive contracts for a given country or district and running for an extended period, to insert a clause requiring the agent or agency to sell a reasonable and stated amount of merchandise during the first six months, failing in which the contract may be terminated at any time. It is unjust that the manufacturer should be rigidly bound while the agent is not.

An entirely different class of export humbugs from the foregoing are the fraudulent export agents and export associations, that used to infest the downtown section of New York and hung

like barnacles about the ventures of innumerable manufacturers who were seeking foreign trade for the first time. Happily the harvest time for these gentry has long since passed away and most of them have turned their talents to gold-brick or other more promising get-rich-quick schemes. The fake export agent usually undertakes to promote the manufacturer's foreign trade strictly on a commission basis, ten per cent. on all orders he originates. This seems fair, and to further establish himself in the confidence of his employer he agrees to furnish duplicates of all his orders. This humbug never wastes his valuable time working for firms having no foreign trade to begin with, confining his efforts to those he learns are at present receiving many orders. He then visits all of the commission houses and tells them he has been appointed local representative of the manufacturer and that in order to increase its foreign business the firm is willing to grant them an extra discount of three to five per cent. on condition that duplicates of each order be given to him. These are then duly turned over to the manufacturer and the ten per cent. agreed upon collected. This valuable fisherman, in a word, fishes only in his employer's basket, yet this fraud has sometimes been practised for years without detection, the manufacturer wrongly assuming that possession of duplicate orders was proof positive that the agent had originated the business. The fake export association bureau and the like, merits only a word. It claims to do everything and as a rule actually does nothing whatever. To secure the confidence of its subscribers it diligently mails out "announcements" of export "openings" just received through its innumerable foreign connections but really culled from the daily Consular reports and free to all, or taken from foreign trade newspapers. Such information is of no value to the recipient in most cases, and when the suggestion is a good one it usually comes too late. This is but one of a dozen similar "services" performed by such organizations, the others being equally valueless. If the manufacturer would only investigate these concerns or inspect the garrets or desk rooms they occupy he would soon be convinced

of their inefficiency, not to say dishonesty. There are plenty of honest and splendidly capable export agents, however. A visit to their offices or a half hour's chat with one of them would show the genuineness of their work, the wide and accurate range of their information regarding foreign trade, while they would welcome rather than resent correspondence with the firms whose foreign trade they have been largely instrumental in building up. The difference between a genuine export agent and the imitation is so great that the manufacturer who is taken in by the humbugs really has himself to blame.

A most pestiferous colony of humbugs once established itself at Amsterdam and preyed upon American manufacturers for a number of years until finally suppressed by the Chamber of Commerce of that city and the post office. These rascals, who turned out to be few in number, fixed up letter heads representing a great number of fictitious firms and wrote around to manufacturers whose names they secured from advertisements in export papers and even from the Consuls. To each one they represented that they were about to open "spacious warerooms" and solicited a few "samples" of his products to be duly installed therein in a place of honor. The fountain pen manufacturer was to send half a dozen or so of his best gold mounted fountain pens, the carriage maker one or two carriages, and so on. No article was too large and none too small to merit a place in this magnificent emporium. Many manufacturers were victimized, particularly those making specialties of no very great value, such as washing machines, kitchen utensils, etc. It was simply a case of petty larceny, no orders ever came and when investigation was set on foot — too late as usual — it was found that no wareroom existed, the firm having only a letter box, which had some time since been given up. This type of humbug still continues to flourish here and there, though no longer at Amsterdam. Not long ago I was shown twenty letters in French from a firm in Egypt addresssed to as many different American manufacturers and asking for samples of all degrees of costliness from a patent scalp brush to a stationary engine.

It was simply the Amsterdam humbug in a new locality. The only way to avoid such pitfalls is either to refuse samples to all foreign buyers unless paid for in advance, or take such steps to ascertain the responsibility of the parties asking for them as ordinary prudence would seem to dictate.

Enough, however, of the human humbugs who in one guise or another seek to entrap the inexperienced or unwary manufacturerwho is after foreign business. There are, to be sure, quite a few other types or species of the export humbug but I should only weary you by attempting to enumerate them all. If what I have said serves to render any of you cautious in the future when one of these humbugs calls and thereby saves you a little tuition money in the dear school of Dame Experience I shall have performed a service to you and to American export trade for which I shall be content. No matter what the scheme may be remember this — if it proposed by a humbug, investigation is death to them all; if by an honest man who has achieved real results and has an honorable record, investigation can only increase your confidence to the mutual advantage of you both. In either case — investigate.

I now desire briefly to call your attention to certain theories and beliefs regarding the principles upon which export trade is based and the manner in which it is conducted that are fallacious, either wholly or in part, and therefore involve the element of humbuggery. For in the domain of logic, or economic theory, and of applied or practical economics, fallacies are the humbugs against which we must be on our guard. There are not a few false theories or principles that exert no small influence upon the commercial world. These usually masquerade as "axioms" or alleged "self-evident" truths, but are in reality either half truths or complete falsehoods.

The ancient Foreign Exchange fallacy embodied in the mercantile theory of the seventeenth century still lingers and pops up every now and then in magazine articles, in political debates and even in the halls of Congress as if it was an eternal truth instead of an infernal humbug. The Treasury department of

the United States is the foremost champion of this doctrine and everybody connected with that great branch of our government from the secretary down to the humblest clerk seems to believe devoutly in this long-exploded doctrine. As quaintly expressed by THOMAS MUN in his book entitled "England's Treasure by Forraign Trade," which was published in 1664, the mercantile theory was as follows: "The ordinary means to encrease our wealth and treasure is by Forraign Trade, wherein we must ever observe this rule; to sell more to strangers yearly than we consume in value." To this he adds a plea for sumptuary laws, "so that men would soberly refrain from excessive consumption of forraign wares in their diet and rayment, with such often change of fashions as is used so much the more to encrease the waste and charge; which vices are more notorious amongst us than in former ages." As I have intimated our Treasury Department still valiantly battles against this vice of importation, to the end that it be diminished and the nation's wealth proportionately increased. To the believer in the mercantile theory the only real wealth was gold, or some form of money. Exports of commodities were a good thing, since they brought gold in return, but imports were a bad thing since they had to be paid for with gold, or reduced by the amount of their value the gold balance due us. We now perceive clearly, however, that gold and money are merely media of exchange and that exports of cotton goods that are paid for with coffee from Brazil, or spices from the East Indies, or rich rugs from Persia, or silk from China or Japan are adding precisely as much to our wealth as though paid for with gold. The policy of the Treasury Department in harassing importers and treating each member of that long suffering fraternity as if he were a criminal and a public enemy is undoubtedly founded upon some hazy notion that imports are *per se* undesirable and should be hampered and restricted as much as possible. No idea is economically more unsound, and I believe that every broad-minded manufacturer in the land will sincerely welcome the new regime of common sense that seems about to be forced upon the department by Germany.

Closely related to this idea that exports should be paid for with gold rather than with commodities is another that perhaps can hardly be termed a fallacy, since it has never found definite expression, but it is at any rate, a fairly well defined notion in the minds of many. This is, that the gold movement in some way expresses in concrete form the measure of the nation's foreign balances. In the last analysis, were a last analysis ever possible, this might be in a measure true, but actually the tides of gold ebb and flow in response to influences so numerous and often so little related to the export and import movement of commodities that the latter is usually a minor and sometimes a negligible factor. Of the four great powers in the world of finance, three — England, France and Germany — produce no gold. The United States, the Klondike, South Africa and Australia are the chief gold producers, of these the first alone being a money center. The gold produced at the mines must sooner or later find its way to the great money centers of the world in response to those profound economic and financial influences that control the gold movement the world over. The principal factors that control gold shipments are: 1.—The money rate on both sides of the Atlantic, high money attracting gold, low money repelling it; 2.—Extraordinary calls for money such as the floating of a huge international loan or the payment of an indemnity; 3.—Heavy purchases or sales of securities in a foreign country; 4.—An abnormal movement of merchandise in either direction. In response to these influences, and to the three first far oftener than to the last, gold is from time to time actually shipped from one great money center to another. That a gold exportation is a ground for alarm or a gold importation a ground for congratulation as regards the bearing of these operations on the state of our foreign trade is a mistake, for the two have little or no bearing on each other. The speculator may with some reason read with apprehension of a gold export since it is apt to portend tighter money, and vice versa. The manufacturer need as a rule pay little heed to the gold movement. Just at the present time an enormous sum of money,

some estimate it as high as $200,000,000 is owed to European banks by the banks of New York on finance bills, issued some time ago when call money at New York was commanding fabulous rates and later renewed and now due for the most part in June, a particularly bad season, by the way. These finance bills will prove a very vital factor in the foreign exchange situation when they become due and will probably cause heavy gold exports. In that event, however, the phenomenon will have no bearing whatever upon the state of our foreign trade but will merely be another evidence of the fact that the conditions that brought about the abnormal call money market at New York must be radically changed before the American metropolis can hope to become the world's money center.

More clearly formulated in the public mind than the notion just discussed is the widely accepted idea that a favorable balance of trade — meaning an excess of exports over imports — is a matter for rejoicing and an evidence of prosperity, while a decline in our customary balance of several hundred millions is a matter for alarm. Here the fallacy is in the nature of a half truth. If the statistics regarding merchandise exports and imports told the whole story we should indeed have reason for congratulation since it would be evident that with true Yankee skill we were beating the whole world at the swapping game in the most laudable fashion and on a most tremendous scale. It is necessary, however, to first take into account several invisible factors of great importance and every one of which, as it happens, throws its weight on the other side of the scale. First, there is the sum due to foreign holders of American securities in interest and dividends. This is a very large amount, although in recent years it has materially decreased owing to our buying back many of these securities ourselves. Second, there is the sum due foreign ship owners, chiefly British, for transporting the immense volume both of our exports and imports on the high seas, and to foreign marine insurance companies for insurance on these cargoes. Time was when Massachusetts alone carried the bulk of our foreign trade in her own staunch clipper

ships, whose sails whitened every sea and bore the names of Boston and Marblehead, and Salem and Newburyport and New Bedford to every corner of the commercial world. That glorious day, unhappily, is no more and we now pay the freight both ways on much of our foreign trade while we are actually paid for carrying less than a tenth of it. Third, there is the huge bill rolled up each year by the ubiquitous spendthrift known as the American tourist. At home we toil for the almighty dollar with an energy that fairly appals our less strenuous friends in other lands. Abroad we spend and squander it with an energy and abandon that, while it is warmly commended by its beneficiaries, is little less astonishing. Fourth, we must take into account the great sum annually sent "to the old country" by our immigrant population, and the even larger sums carried home by returning immigrants, or expended in passage money. There are still other factors of importance, but these are enough to account for substantially the entire "balance" or excess of exports over imports. If this balance were by itself a true measure of a nation's prosperity England would long ago have succumbed, for her adverse balances are heavier than our favorable ones. The explanation in her case is chiefly the enormous investments of British capital in every part of the world, the interest and dividends on which find their way home, not in the form of gold, as our mercantile theorists would have it, but in the form of every commodity known to human commerce at the present day.

Thus far I have been verging rather close upon the domain of the so called "dismal" science of political economy. A few years ago it would have seemed somewhat unusual to discuss economic theories before a convention of business men, but at present more and more men of business are perceiving the practical bearing of these abstract theories upon commerce in its larger aspects, and especially upon international commerce. I hope before very long to see the text-books on the principles of economies rewritten by business men, not that the schoolmasters have not given us good books but that there is, I

believe, still quite a gap between modern commercial practice and the theories and principles that are taught regarding certain aspects and phases of world commerce. Quitting then the field of economics let us turn to a number of popular fallacies that require attention. Of these one of the most unfortunate is the idea apparently held by many otherwise sensible business men that the foreign market is only useful as a dumping ground for surplus stock or archaic styles. The harm this practice has wrought to the permanent welfare of American export trade is simply incalculable. Now and then there may be cases where the foreign buyer, for reasons of economy, will prefer ancient styles or certain cheap lines of goods, but as a rule he wants the best we have to offer and the constant and energetic competition of Germany, England, Belgium, France and other great manufacturing nations, each of which sends out more foreign salesmen than we do and is in general more alert in noting the grade of goods with which it is necessary to compete, renders it certain that in no long time not only will our inferior offerings be displaced but American goods in that line will receive a bad reputation in the markets of the world that it will take years to overcome.

Allied to this idea in its pernicious influence on our foreign trade is the sister notion that export trade is only useful as a resource when domestic trade is dull, and can be profitably abandoned the moment home demand picks up. This absurd fallacy has prevailed to a simply amazing extent among manufacturers who in their domestic trade show every evidence of being both honorable and far-sighted business men. It is only necessary to consider the point of view of the foreign buyer to perceive that this policy toward him is neither honorable nor far-sighted, but is most distinctly the opposite of both. He is almost without exception, whether in Latin-America, or China, or South Africa, or Europe, a most conservative man, this foreign buyer. He gives his trade as a rule to the same manufacturers year after year and is exceedingly reluctant to make a change. A period of hard times and over-production comes

along in the United States and manufacturers hasten to send salesmen abroad to secure an outlet there, without which their mills will stop running to their own loss, or their surplus must be thrown on the home market to the demoralization of the trade. One of these salesmen comes to the foreign buyer and after much argument succeeds in persuading him to place an order in the United States instead of in Europe whither it had gone heretofore, not only during his time but perhaps during that of his father and grandfather. No small matter to make such a change you will perceive. The goods arrive, are placed on sale, prove a success, and more are ordered. Presently the demand for them becomes steady, their merits are known and appreciated and the buyer begins to congratulate himself that he has made a wise move. He sends a larger order for the next season only to be dumbfounded by receiving a curt announcement that " our factory has all the orders it can fill, go somewhere else." It is like a blow in the face. Of course he goes somewhere else, back to the European manufacturers who have been supplying his house for half a century with unfailing regularity. You can readily understand the enormous difficulty the next American salesman will have in securing, not merely an order but even an audience from this buyer. It is not by policies like this that we are to become the greatest exporting nation on earth.

Another idea that means loss of money, both to the individual manufacturer and to the country is the notion that a successful export trade can be established in a moment and whenever needed to tide over an emergency. On the contrary a sound export business is a matter of far slower growth than a home trade of equal magnitude. Foreign buyers are most reluctant to change their connections and do so only after the most persistent canvass and for the strongest possible reasons. Conversely, however, when their trade and confidence is once secured it is equally hard for anyone else to take it away. President ROOSEVELT has taught us that a great navy cannot be built in a day nor to meet a sudden emergency. Neither can a sound and profitable foreign outlet for our manufactures.

Another axiom, so called, that does not apply to foreign trade is CARNEGIE'S " Put all your eggs in one basket, and watch the basket." The cotton manufacturers seem to be doing this with respect to China. It is unwise, dangerous, and may result in enormous loss. An ideal export outlet is one that covers every buying market on the globe. Hard times are rarely universal; floods, famines, seismic disasters never are. Nor do political upheavals usually upset trade everywhere at once.

A great many American manufacturers seem to think that we have a heaven born mission to spread the gospel of Yankee styles of plows and harrows, or other utensils (or cotton goods for that matter) regardless of what the natives want. This is perhaps not wholly a fallacy for I should be the last to deny that we have in many instances marvellously revolutionized the world with some of our inventions and won over mankind to the belief that ours are the best. At the same time — and this applies with especial force to cotton goods and textiles generally — the native taste must be consulted and to a very large extent catered to if we are to succeed. To tell the buyer in Mozambique who asks for twenty-seven inch blue cloths in twenty-one yard lengths that we make such blue cloths only in fifty yard lengths means to throw away his trade. Such a policy is a good one to destroy export trade, not to create and extend it.

I now come to a fallacy on which I wish to dwell at some length because I find that it is nowhere held so persistently as right here in Boston, where it has become indeed from time immemorial almost an article of faith and I fear that in attacking it I shall cause hardly less horror than if I were to speak disrespectfully of the sacred codfish. This is the idea that foreign labor is cheaper than our own. I am not going to plunge you into the labyrinth of statistics that appear on this subject at every presidential election and every tariff debate. I am not here arguing on the tariff question at all. I am simply talking to a sensible body of manufacturers about a topic that should be approached in a sensible manner and not treated as if it were a

bugaboo that needs only to be seen to demolish all opposition and render speechless all argument. I believe that thousands and tens of thousands of American manufacturers are opposed to attempting to sell their goods abroad today because they are, in their inmost hearts, scared by this horrid monster of foreign competition. Now I firmly believe that in ninety-nine instances out of a hundred the American manufacturer can beat his European competitors on prices if he sets out to do so, and that the element of labor cost will work out in his favor at least as often as it is against him — his advantage in prices in the other instances being due to cheaper raw materials, cheaper transportation or other factors. I wish that I could stop to elaborate this point, for it is one upon which I have very deep and earnest convictions, but I have already made this paper longer than I meant to. But, to be brief, why can we not approach this matter of relative labor costs in a spirit of common sense and with open minds? Most of the gentlemen before me have doubtless traveled in Europe and will do so again. The next time, instead of doing the grand tour, take a look around at some European factories. I am sure that our English friends who are your guests today will gladly show you theirs. On the Continent it will be harder, but all things are possible to an American — who says "Show me." You will see some surprising things, more especially on the Continent. Note the hours of labor, the continuity of labor, or rather its absurd lack of continuity. Study carefully its effectiveness, the per capita rate of production. Note its capacity in "gumption" and ingenuity and loyalty to the employer. Note the influence of trade-unionism — vastly more active, meddlesome and tyrannical there than here. Note a hundred factors other than the one factor we have always had dinned into our ears, of difference in wages. Then note again what that difference in wages means — in real wages not in money. How much the Belgian buys with his two francs as against what the American buys with his dollar for corresponding work. And in your study of these things believe your own eyes and ears, not the statistic-monger or the politi-

cian. And then, after a summer of such study, if you still believe that America is a loser in the world-contest for commercial supremacy in point of labor cost I should like to hear from you.

Next in importance to labor cost comes the question of credits and here again American manufacturers have a little theory that costs them millions every year in lost opportunities. This is that "Terms cash" is the way and the only way to treat foreign buyers and that the long terms of credit granted by our European competitors are somehow impossible for us. Why impossible? We can secure as accurate and as prompt credit information as they. Our credit men are surely as intelligent. The trouble is that our manufacturers do not know what has been going on in this field during the last ten years — do not know that the leading American mercantile agency now has no less than fifty-three foreign branch offices, located in nearly every important commercial country and in most of the leading trade centers; do not know that these offices are ready to furnish just the same detailed reports regarding foreign business houses that we are accustomed to get concerning firms right here at home; do not know that such reports can be had as promptly, in many cases, as domestic reports — the records being on file right here in the United States — and that if special reports are needed they can be had as quickly as the mails permit. There are, to be sure, other elements in the matter of granting foreign credit than the standing of the buying firm. We must study and meet the prevailing European terms, which usually are longer than we are familiar with — running sometimes to a year. I am not, in saying this, counseling American manufacturers to grant credit in any country under speculative conditions which render usurious rates of interest necessary. There are markets enough where trade conditions are as normal and credits as safe as they are here at home and it is in these markets that we should seek to extend our trade by the legitimate extension of credit on safe and conservative lines.

The cheap popular magazines and the Sunday supplements to the daily papers are responsible for a vast flood of misinfor-

mation about foreign trade and the solemn parading of innumerable ancient fallacies about foreign trade topics as if they were newly discovered truths. The cheap-jack essayist who writes on a hundred topics, none of which he thoroughly understands, should never be taken at par value by the intelligent reader. Ask yourself, "Is that so, is it probable, is it possible?" The old superstitious reverence for the printed assertion leads us too often to accept without mental question statements that are essentially fallacious, and which lead to conclusions that are not only false but may be even pernicious — discouraging us from attempting things which are quite feasible or leading us to believe that the results already attained are insignificant or ridiculous. Not long ago one of the most brilliant American essayists on foreign trade made a very clever presentation of the exports of the United States calculated on a per capita basis — that is dividing every figure first by 75,000,000 to get the share to each man, woman and child, then dividing again by 52 or 365 to get the share of each per week or per day. The results were startling — and amusing — but really meaningless. It was a mere juggling with statistics, clever to be sure, but of no more practical value than the performance of the chap who stands on his head at the vaudeville show and tosses little balls and plates and fans around on his toes. Thus it was shown that our total trade with South America amounted to an average per capita revenue to the people of the United States of less than a cent per week. This sounds very bad, to be sure. But if we stop to consider that even at this miserable rate we enjoy one-eighth of South America's import trade we will perceive that if we secured every bit of it we should have an annual per capita revenue of only a trifle over one cent a day. Reduced to such terms any trade can be made to appear ridiculous. In the same way this writer sought to throw contempt upon our trade with China by reducing it to a per capita basis. He found that our trade with all Asia, on this basis, amounted to less than a cent per week, and our trade with China — aside from kerosene and cotton goods — to be a trifle over two cents per capita per year.

Yet every man in this room knows what happened when we lost this ridiculous China trade by reason of the Boxer outbreak, how mill after mill in the South had to shut its doors while overproduction in coarse goods and the turning of mills into other lines caused a disturbance of the entire trade of very serious proportions. Asia's one cent trade per week meant the loss of a good many thousand dollars a week to some of you when this one branch of the trade in one Asiatic country was suddenly cut off. A British writer sometimes referred to as an "expert" on international trade recently wrote an article in a business magazine published in London in which he stated that the soles of American shoes are made of a mixture of glucose and sawdust," that "American leather is no better than brown paper," and that $5.00 and $10.00 boots bought right here in Boston fell to pieces when exposed to water for a few hours, and so on *ad nauseam*. Such absurd statements can do no particular harm to American shoe manufacturers, but if any British manufacturer should read and believe them he would commit the grave blunder of underestimating his competitors. A few years ago a flood of magazine and newspaper nonsense was written both in this country and in England about the alleged "American Invasion" of Great Britain. There can be no doubt that both nations were injured by the rubbish that was ladled out at that time.

In conclusion let me say this: in dealing with humbugs in the export field investigate; in dealing with humbug theories, or fallacies, regarding export trade, think for yourself.

The PRESIDENT. The session is adjourned until two o'clock.

SECOND SESSION.

WEDNESDAY AFTERNOON, APRIL 25, 1906.

The Association met in Huntington Hall at 2 P. M., President MACCOLL in the chair.

The PRESIDENT. We very much regret that some unexpected conditions arose in England which prevented Mr. JOHN SMETHURST, Secretary of the International Federation of Master Spinners' and Manufacturers' Associations, from being with us now. But we are very fortunate in having with us Mr. H. W. MACALISTER, who is the chairman of the English Commission that is now visiting this country. Mr. MACALISTER, is a member of the English Federation and is very closely identified with the work of the International Federation and he will address us on the same subject upon which Mr. SMETHURST was to speak to us, The Objects of the International Federation of Master Cotton Spinners' and Manufacturers' Associations. [Applause.]

OBJECTS OF THE INTERNATIONAL FEDERATION OF MASTER COTTON SPINNERS' AND MANUFACTURERS' ASSOCIATIONS.

H. W. MACALISTER, 33 York St., Manchester, England.

Before proceeding with the subject matter upon the programme now before you, permit me to express my regret that Mr. JOHN SMETHURST, the Honorary Secretary of The International Federation of Master Cotton Spinners' and Manufacturers' Associations, who was deputed to be its representative here today, has been unavoidably detained in England owing to an industrial crisis which has recently arisen.

I regret his absence more especially because he is, owing to his official position, intimately acquainted with the work carried on by the Executive Committee of this Federation, and consequently would have been able to present you with a more satisfactory account of its aims than I can do.

I have been requested by cable to fill his place, and as the papers connected with this matter only came into my hands at a late hour last night, I trust that you will extend some consideration for any shortcomings or defects which a hastily written paper may betray.

The acute crisis which occurred in the cotton trade in 1903-4 brought about by the short supply of the raw material pressed most severely upon the manufacturers and spinners of Lancashire. Prices reached such a high level that the demand for the manufactured products fell off. By common consent, apparently, the distributors of goods, wholesale and retail, declined to carry their usual stocks and the effect of this policy gradually

fell back upon the producers of cloth and yarn, whose mills were kept running at no profit or at serious loss. Stocks on hand became burdensome and financial necessity forced upon the trade the consideration of a reduction of production upon an organized system.

Those firms whose finances were strong had two courses open to them:

To keep their factories running, and thus drive their weaker competitors to the wall, or

To curtail production individually and watch events.

The weaker concerns, however, suffered so severely under the financial stress that eventually a mass meeting was called of both sections of the trade, (Spinners and Manufacturers) which was held in Manchester on December 29, 1903. Representatives of both employers and operatives were present and it was resolved almost unanimously to request the English Federation of Master Cotton Spinners' Associations to organize a movement to reduce the consumption of American cotton by working forty instead of fifty-five and a half hours per week, and this was finally successfully arranged. It was, however, felt very keenly that for many years past the effects of recurring crises brought about by similar causes had been largely borne patiently by British manufacturers with but little assistance from their neighbors. It was, therefore, decided to take steps to establish communication with Continental Associations with a view of arranging a scheme for mutual assistance and protection.

The Swiss Association of Cotton Spinners and Manufacturers was invited to act with the English Federation of Master Cotton Spinners as joint convenors of a Congress, and the response to their invitation to send delegates to a meeting to be held on May 23, 1904, was warmly accepted, representatives of nine nationalties being present. The meeting was a great success and the foundation of the International Federation of Master Cotton Spinners' and Manufacturers' Associations was thus laid.

Mr. MACARA, President of the English Federation of Master Cotton Spinners, was requested to fill the position of chairman and accepted the invitation.

I would here venture to express my strong belief that in meetings of this kind when men of different nationalities come together in conference for the discussion and organization of their commercial relations, the good seed of mutual respect and friendship is thus sown and is even now germinating and will at no very distant date, I fervently hope, become a great tree to the end that the cruel arbitrament of war may be succeeded by the peaceful settlement of national differences by mutual concessions.

During the succeeding twelve months the International Committee was continually engaged in the various duties allotted to it by that Congress and its members met in Paris, Brussels and London for the transaction of business. Much care was devoted to the preparation of a constitution and code of rules for its efficient working.

The second annual Congress was held on June 8 and 9 last in Manchester and Liverpool, when the regulations and by-laws above referred to were unanimously adopted. An organizing secretary possessing a thorough command of the three official languages, (English, French and German), was appointed, and at the same meeting the headquarters of the Association was definitely established in Manchester, Mr. MACARA, by unanimous request, continuing to act as chairman.

The objects of this International Federation are embodied in the code of rules to which I have already referred, and I shall read to you a few of those to which I wish to call your attention.

STATUTES.

Object.

1—The purpose of this International Federation shall be to watch over and protect the common interests of the Industry, and to advise Associations of the action to be taken against any common danger.

2—The means to be employed are:—

(1)—The holding of Congresses of Delegates from the Associations

in all countries becoming affiliated with the International Federation.

(2)—The appointment of a Committee of Management, who shall:—

(a) Control the work and expend the moneys of the Federation under the instruction of the Congress.

(b) Distribute information of practical value in carrying on and improving the conditions of the Cotton Trade.

(c) Assist in the information, strengthening and assimilating of Associations in all Spinning and Manufacturing Centres of the Cotton Industry.

(d) Call together the Delegates to special Congresses when the need shall arise.

(e) Consult the Associations by correspondence, and distribute and collect voting papers from the Associations on any international movement in connection with the trade.

(f) Take any other action in the common interest of the Trade that may be decided upon by the Congress.

Membership.

3—All Associations of Cotton Spinners and Manufacturers are eligible for affiliation with the International Federation, subject to their acceptance by Committee and Congress.

Financial.

4—A Levy shall be paid by each Association according to its number of Spindles and Looms.

5—Spindles shall include Mule, Ring, Throstle and Doubling, Two Doubling Spindles to be equal to one Mule Spindle.

6—Each Association joining the Federation shall pay an Entrance Fee of $\frac{1}{100}$ of a penny per Spindle, and one farthing per Loom (one Loom to be equal to 25 Spindles). This Entrance Fee shall include the current year's levy.

7—For the year 1905, and each succeeding year until otherwise determined, a Levy shall be made of $\frac{1}{100}$ of a penny per spindle and one-eighth of a penny per loom. Associations are liable for the coming year's levy unless they have handed in their resignation at least three months before the end of the current year. Resignation forfeits all right to any accumulative funds.

8—All Levies shall, after the year 1904, be due for payment before the end of September.

9—In case any Association shall fail to pay its Levy, or send Delegates to the Congress, the name of such Association shall be placed before the Congress to take what steps it may think fit.

Offices.

10—The offices of the Federation shall be in Manchester. Any change in the headquarters must be by decision of the Annual Congress.

BY-LAWS FOR COMMITTEE.

11—The Committee of Management shall consist of one Delegate from each country affiliated to the International Federation, and the Committee, from its own members, shall appoint a Chairman, Vice-Chairman and two Honorary Treasurers of the Federation. Each country shall appoint its own Delegate. The country which the Chairman of the Committee of Management represents shall be entitled to another representative on the Committee.

12—For the Committee of Management, five shall form a quorum.

13—Each country shall have the right to appoint a substitute to attend the meetings of the Committee in the event of its representative being unable to attend. This substitute, in order to become conversant with the work of the Committee, may accompany the duly appointed representative to any meetings of Committee, if the Associations in his country so desire, but in the latter case his expenses will not be paid by the International Federation, nor has he power to vote, and it is not expected that he will take part in discussions at the meetings.

14—The Committee shall appoint its Secretary, or Secretaties, and other Assistants, Bankers, Auditors and Solicitors; and such appointments shall be confirmed annually or otherwise.

15—The Committee shall have power to appoint, from its own body, any of its members for the purpose of obtaining information, or undertaking preparatory work, in connection with any of the objects of the Federation. Such information or preparatory work to be reported upon periodically to the Committe through its Secretary.

16—Should a position as Officer or Member of the Committee become vacant by death or resignation, the Committee shall have power to fill such position, if an Officer, from its own body; if a Member of the Committee, from the Delegates from the country represented.

17—The Committee shall meet when it is desirable, but where possible the consultation shall be done by correspondence. When possible, at least four weeks' notice shall be given of any meeting of the Committee of Management.

18—On the request of one-fourth of the Members of the Committee (which always includes the Officers), the Chairman shall call a meeting.

Expenses of Members of Committee.

19—The Members of the Committee of Management, when attending meetings of the Committee, shall be allowed first-class fares and 40 francs per day for out-of-pocket expenses.

Bank Account.

20—The Bank Account shall be in the names of the Chairman of the Committee and the Secretary at headquarters, and all cheques shall be signed by the Chairman, or one of the Honorary Treasurers, and countersigned by one of the Secretaries.

21—The Bank Account shall not be overdrawn, and no expenditure or liability shall be incurred for which there are no funds in the Bank.

Close of Financial Year.

22—The financial year shall end 31st December.

Dissolution.

23—In case of dissolution the funds in hand shall be divided on the basis of the contributions made by the affiliated Associations.

REGULATIONS FOR CONGRESS.

24 — The Annual Congress shall be in a different country each year.

25 — When possible, at least four weeks' notice shall be given of any meeting of Congress.

26 — The Associations in each country shall appoint Delegates to attend the Congresses. No restriction shall be placed on the number of Delegates any Association may send, but the voting power shall be as follows: —

One vote for each Million Spindles or part thereof.

One vote for each 40,000 Looms or part thereof, but not more than Twenty Votes to be given by any one country.

Voting shall be by the showing of hands, but shall be by ballot if desired by twenty-five per cent. of those present empowered to vote.

27 — Each Association shall, before the end of March, appoint its Delegates for the following Congress, and shall at once intimate to the Secretary the names, postal addresses, and cable addresses of such Delegates.

28 — Fourteen days' notice shall, if possible, be given to the Secretary at headquarters of any change in the appointment of Delegates.

29 — The expenses of Delegates shall be paid by the Association they represent, or by the Delegates themselves.

30 — If a Delegate be unable to be present, he may be replaced by another representative of his Association. This representative, however, must present satisfactory credentials to the Committee.

31 — Any Association wishing to bring a subject before the Annual Congress, or propose the alteration of a Rule, shall forward its resolution to the Secretary at headquarters before the end of March.

32 — The member of the Committee of Management representing the country in which the Congress assembles shall preside over such Congress. The names of the Delegates shall be called over; after which the Chairman of the Committee of Management shall present a report to be followed by the reading of the Financial Statement.

33 — The remaining proceedings shall be arranged by the Committee of Management, but shall be subject to alteration should the Congress desire.

34 — Permission may be granted for the discussion of matters which do not comply with Rule 31, but no vote can be taken.

35 — In order to expedite the discussions of the Congress, the introducer of any subject shall be allowed one hour. Subsequent speakers shall be allowed fifteen minutes, which the Chairman may at his discretion extend to thirty minutes.

36 — Delegates may speak in English, French or German, but it is desirable that they use the English language in order to obviate, as far as possible, the necessity of translation.

37 — No resolution in any Congress shall be voted upon except 75 per cent. of the Delegates empowered to vote are present, and no resolution shall be carried except by a majority of 75 per cent. of those voting.

38 — No resolution shall be voted upon at the sitting in which it has been introduced (unless a 75 per cent. majority be in favour of such vote being taken), except for the appointment of Officers of the Congress and the fixing of the next place of the Congress.

39 — The place of meeting for the next Congress shall be decided upon at the last meeting of a Congress.

Official Reporters.

40 — Official Reporters shall be appointed to take a verbatim report of all proceedings, and submit a general report of the day's proceedings for the Committee's approval before giving it to the Press.

Visitors.

41 — No strangers shall be allowed to attend the sittings of Congress, except they have a special written permit from the Committee.

Voting by Correspondence.

42 — Voting by correspondence with the Associations shall be by Spindles (one Loom equalling 25 Spindles, and two Doubling Spindles

to be equal to one Mule Spindle). The ratio of voting power shall be as per Rule 26.

Alteration of Rules.

43 — These Rules may be added to, varied, or rescinded at any annual Congress, but notice of any proposed alteration shall be sent by the Secretary with the notice convening the Annual Congress.

Local Committees.

44 — Local Committees may be formed in each country for the purpose of discussing questions of International interest. The meeting forming such Local Committee shall be convened by the various representatives on the Committee of Management.

I find that your own Association in its Constitution and By-laws, thus declares its purpose:

"By reason of its close relations with progress in cotton manufacture, it seeks the support and affiliation of those engaged in the business and tributary occupations."

"The purpose of this Association is to render itself aggressively useful to the cotton manufacturing interest by affording every facility for an interchange of experiences and opinions."

The third annual Congress of the Federation is to be held in Bremen on the 25th, 26th and 27th of June, and it is now, Mr. President and Gentlemen, my very pleasing privilege and duty on behalf of The International Federation of Master Cotton Spinners' and Manufacturers' Association, to offer to your New England Cotton Manufacturers' and other American Associations engaged in the manufacture of cotton a most cordial invitation to send a full representation of delegates who shall take part in the proceedings of that meeting.

One of your speakers, Mr. FISH, to whom I listened with very great interest, made some remarks on the subject of the change in the name of your Association. I am delighted to find that the step has been taken at this Congress, because it

meets with the views which I hold myself as being so necessary to the well-being of every one of us as representing Federations of Manufacturers.

His remarks on the forward step which he today suggested that your Association should take, under its new name of The National Association of Cotton Manufacturers, viz: That you should endeavor to affiliate other associations of American spinners and manufacturers with your own, meets with my warm adherence, but I would ask you to be still more enterprising and that you will accept the cordial invitation from The International Federation of which I have the honor to be the bearer. The broad views relating to your American associations, which Mr. FISH has so well advocated, would thus be still further expanded by your presence at a World's Congress. I trust, gentlemen, that you will give this invitation your careful consideration and I hope send a favorable reply thereto.

There is one point to which I wish to call your special attention. It is this: I dare say you may have observed that in the rules which I read to you, no reference is made to the interference in any way with the respective local conditions and institutions connected with the industries within the various countries represented. That is to say, if a wages question or any national domestic trade difficulty occurred, it would not come within the province of the International Association to interfere with it.

The object of the International Federation is principally to deal with questions which affect the trade from a world's standpoint. For instance in the years 1903-4 when the great speculative troubles were rampant, during which, as one of your speakers remarked today, your New England spinners suffered so severely, we in Lancashire suffered equally. In my own experience, during six months of that troublous year, one concern in which I am interested lost ten per cent. of its capital, but this, I am glad to say, has since been recouped during the good times which we have all recently been enjoying in common. It is with serious conditions such as I have mentioned that the International Federation will be called upon to deal.

The PRESIDENT. Are there any remarks on this paper? If not, Mr. MACALISTER will be glad to give us an outline of the program of the coming International Congress.

Mr. H. W. MACALISTER. I have here a preliminary program of the Third International Congress to be held in Bremen on June 25 and following days.

Papers are to be read upon The Rules of Cotton Exchanges; Moisture in Cotton; The Means at Spinners' Disposal of Obtaining Adequate Supplies of Cotton Upon a More Stable Basis; Cotton Statistics; Cotton Growing, by representatives from England, France, Germany, Portugal and Spain.

On the evening of June 25th, delegates will be entertained at a banquet by the Senate of Bremen; on the 26th, at a banquet by the Bremen Cotton Exchange and Chamber of Commerce; on the 27th, to lunch by the Spinners' Associations of Germany. In the afternoon, they will proceed by train to Bremerhaven, where they will board an Atlantic liner which has been most generously placed at their disposal by the North German Lloyd Steamship Company. The steamer will sail for Kiel for the purpose of witnessing the regatta. Whilst on the steamer the delegates will be the guests of the North German Lloyd Steamship Company.

Now, gentlemen, if there are any questions which you wish to ask me, I will endeavor to answer them to the best of my ability. Copies of the Official Report of the proceedings of the last Annual Congress held in Manchester and Liverpool are here for distribution by your respected Secretary.

The PRESIDENT. A record of three score years and ten in cotton manufacturing is a rare, and unique experience. The gentleman who can tell this story is one of the ex-presidents of our Association, and he needs no introduction. Mr. STEPHEN A. KNIGHT. [Applause.]

Mr. STEPHEN A. KNIGHT. I presume some of you gentlemen have heard the story of the Irishman who, seeing a fero-

cious bull in a pasture, conceived the idea that he could tame the bull and he indulged in a hearty laugh over the prospect of subduing the ferocious animal. He climbed over the fence and no sooner had he arrived there than Mr. Bull took him on his horns and set him back into the highway. Pat pulled himself together and said, "Begorry, it was lucky that I had my laugh before I tackled the bull." [Laughter.] It occurred to me that perhaps it might be fortunate for me that I had my applause before I read my paper.

After listening to the eloquent addresses this morning and the interesting papers that have been presented, it makes me feel that my little effort is quite insignificant. It is not designed as an instructive paper but rather as a historical sketch of some of my early years and my later life. I feel that it is more of a historical nature than otherwise, and I sincerely hope that it may prove interesting and entertaining to my hearers.

REMINISCENCES OF SEVENTY-ONE YEARS IN THE COTTON SPINNING INDUSTRY.

STEPHEN A. KNIGHT, Providence, R. I.

When your President and Secretary asked me to write a paper giving some of the recollections of my early life as connected with the cotton industry, I hesitated because I felt I would not be able to do the subject justice. That same feeling is with me today, but if you will bear with me for a brief moment I will try and relate some of the memories of long years ago.

On the first day of April in the year of our Lord one thousand eight hundred and thirty-five the writer of this paper commenced his labors in a cotton mill as bobbin boy, or, as it was termed in those days, back boy. The mill was in the state of Rhode Island being in the town of Coventry. It was owned by a man who was at one time Governor of Rhode Island, a man who was a progressive and intelligent manufacturer. His mill was "up-to-date" and among the most successful in the country at that time.

My work was to put in the roving on a pair of mules containing 256 spindles. It required three hands, — a spinner, a fore side piecer and a back boy, — to keep that pair of mules in operation. The spinner who worked alongside with me died about two years ago at the age of one hundred and three years, an evidence that all do not die young who spend their early life in a cotton mill. I am hoping to go him one better.

The running time for that mill, on an average, was about fourteen hours per day. In the summer months we went in as

early as we could see, worked about an hour and a half, and then had a half hour for breakfast. At twelve o'clock we had another half hour for dinner, and then we worked until the stars were out.

From September 20 until March 20, we went to work at five o'clock in the morning and came out at eight o'clock at night, having the same hours for meals as in the summer time.

For my services I was allowed forty-two cents per week, which, being analyzed, was seven cents per day, or one-half cent per hour.

The proprietor of that mill was accustomed to make a contract with his help on the first day of April, for the coming year. That contract was supposed to be sacred and it was looked upon as a disgrace to ignore the contracts thus made. On one of these anniversaries, a mother with several children suggested to the proprietor that the pay seemed small. The proprietor replied "You get enough to eat, don't you?" The mother said, "Just enough to keep the wolf from the door." He then remarked, "You get enough clothes to wear, don't you?" to which she answered, "Barely enough to cover our nakedness." "Well," said the proprietor, "We want the rest." And that proprietor, on the whole, was as kind and considerate to his help as was any other manufacturer at that time.

The opportunities for an education among the factory help was exceedingly limited, as you can well see, both from the standpoint of time and from the standpoint of money.

But, gentlemen, we are living in better days. We work less hours, get better pay, live in better homes and have better opportunities to obtain an education.

The power for the mill, that I have mentioned, was taken from the north branch of the Pawtuxet river on to a breast wheel, connected with segment gears, to an upright shaft by a pinion gear. The wheel was in about the centre of the mill and occupied a space on the first floor, about twenty feet long and about three-quarters of the width of the mill, full height of the first story which was the weaving room. The upright, as well as

most of the shafting in the mill, was square, turned only where the bearings came. A main line ran from the upright each way and was driven by a crown wheel and bevel pinion gears.

The upright ran up through the entire mill. The driving pulleys, or, more properly speaking, the drums were wood with iron clamps to connect them to the shafting, made tight and trued up with iron wedges. The belting was made by the overseer in each room from sides of leather just as it came from the tannery.

The cotton came to the mill in large, uncompressed square bales tied with ropes, or sometimes in round bales without ropes, but always soft and fleecy, so it was comparatively easy to spread on the card. There was no lapper. The cotton was fed by hand onto an apron attached to the card and driven by a band or belt. The apron was marked in sections and a certain amount of cotton, spread by hand, on each section.

The cylinders of the cards were 18 inches in length, and as I remember 42 inches in diameter. The frames were made of wood, and a cumbersome machine they were.

The stripping was done by hand and an expert stripper was paid three shillings and six pence, or 58 cents per day.

The sliver from the breakers — it was double carding — was then run through a doubler into laps, next through the finisher, and from the finishers in cans to a three roll drawing machine, which was rather a crude one. It had a wooden table, and wooden legs for its support, and had neither stop motion or evener.

From the drawing the sliver was carried to the speeder which were called "Taunton speeders," I don't know what gave them that name, perhaps they were made in Taunton. I presume some of you gentlemen have seen some of these machines running.

The roving had no twist but was compressed by running through an endless belt, made of woolen cloth or listing. The doubling was light. The evenness of the yarn depended largely on the uniform spreading of the cotton on the cards, and the vigilance of the drawing tenders.

The spinning frames were throstle or flyer frames. They had 24 spindles on a side and 48 spindles to a frame. The cylinders were made of wood and the spindle rails were also made of wood. On No. 24 yarn the front roll ran from 38 to 42 turns per minute. The pay for tending these frames was 25 cents per side and a good spinner could tend from 8 to 10 sides.

The yarn was spooled on drum spoolers, warped on warpers without stop motions, and dressed on dressing machines quite similar to those commonly used up to the time when the slasher came into use.

The mules were rather a clumsy piece of machinery. The heads, roller beams and sampsons were of wood. The drums were also made of wood with an iron rim attached, scored for the drum band. The average spinner made about five dollars per week. Later on some of these mules were doubled up, that is, two pairs were made into one pair with the heads in the middle. I well remember when the first pair of mules, so changed, were about ready to start. I was looking them over, I presume, quite knowingly. The superintendent said, "Well, Stephen, what do you think of it?" I answered, "Where are you going to put the waste box?" He replied, "We think of putting it on the fly wheel." I was not asked for, nor did I give my opinion again that day.

The looms were quite rudely made and were speeded from 60 to 70 picks per minute. Weavers made all the way from three to five dollars per week. Overseers were paid from six to seven and a half dollars per week, he being an uncommonly bright man who could command the latter price.

The chore men, out door men, and men of all work were paid all the way from four to six dollars per week. I have been particular in giving the prices paid for the different departments and the hours worked, in order that you may contrast the vast advantage that labor has today over that of seventy years ago.

I worked in the mill mentioned about eleven years. Great improvements were made in that time. Wider cards were got and a lapper was installed. A new drawing with a stop motion took

the place of the old. Geared speeders were introduced. Ring spinning was substituted for the thostle frames and many minor improvements were adopted that improved the quality of the goods and reduced the cost of production.

It is not my purpose to speak of the many improvements of recent date but leave it for you to compare today with the conditions of seventy years ago.

I have previously said "We work less hours, get better pay, live in better homes, and have better opportunities for obtaining an education." In the place of eighty-four hours we now work fifty-eight hours per week, a difference of twenty-six hours, and as an employer of help I am glad of it. We are not allowed to employ children at the tender age that was in vogue seventy-one years ago. As an employer of help I am glad of that. We get better pay for our services. There is at least an advance of two hundred per cent., and in many cases more than that. We live in better homes; our houses are larger, better finished and kept in better repair. When I was a boy, if we wanted a room re-papered or painted, or even whitewashed, we had to do it at our own expense. It is quite different now. Every village of any size employs painters and other help enough to keep our houses in good, neat and healthly condition, while the sanitary condition receives especial care.

Many of our employees have homes of their own, built with money earned in our manufactories, a thing almost unknown seventy years ago.

The opportunities for obtaining an education are almost all that can be desired. We have the kindergarten, the primary, the grammar and the high schools in most of our villages; and then we have the School of Technology, the Manual Training School, the Textile School, and last but not least, the benefit of the minds and experience of the members of the New England Cotton Manufacturers' Association which are all opportunities we may well be thankful for.

I have many times been asked, if, in my opinion, the young man of today had as good a chance to make his mark in the

business world as did his elders? My answer is, "Never since our Pilgrim Fathers landed on the shores of Plymouth, were the opportunities for the young man's success greater than they are today. It is for him to determine whether he will be a success or not. The gates and the avenues are open to him, and it is for him to elect whether he will or will not, avail himself of the golden opportunities awaiting him."

In my mill life of seventy-one years I have worked in only four mills. First, in the mill that I have previously described; then at Riverpoint, in Warwick, R. I.; next after that at Pontiac, also in Warwick, R. I.; then I went to Hebronville, Attleboro, Mass., where I have acted as superintendent, agent or president for fifty-three years.

I am a believer in the old proverb that "A rolling-stone gathers no moss." I know there is another proverb that "A setting hen lays no eggs." But it does not of a necessity follow that if not a rolling-stone, one must be a setting hen.

Will you gentlemen, who are overseers, superintendents, or holders of any office of trust, pardon me if I presume to say a word to you?

First of all, I would say be faithful, be loyal and true to the interests of your employers. So serve them that they will feel that they cannot well get along without you, let their interest be your interest, never forgetting that true merit ever has been, and always will be appreciated and both you and I will be glad of it.

The PRESIDENT. Perhaps some of our older members can supplement these reminiscences of years gone by, perhaps not reaching back as far as sixty years, but possibly fifty years. I will be very glad if any one will make a few remarks.

[No response.]

Cost of Raising Cotton, EBEN C. WILLEY, Fall River, Mass. [Applause.]

COST OF RAISING COTTON.

EBEN C. WILLEY, Fall River, Mass.

For several years the fluctuation in the price of cotton has been a serious detriment to the cotton industry of the world, and if it had not been for the favorable seasons of 1904-5 and the increased acreage planted in cotton, all cotton manufacturers would have been facing a problem which in the process of solving would have created a crisis in the industry, and the loss to same cannot be estimated.

It is not possible to adjust the price in manufacturing on either yarns or cloth, as it is in wheat and other cereals. Flour for instance; its wholesale price rises and falls correspondingly with the market price of wheat, as the product of same is absorbed as it leaves the miller's hands; while, on the other hand, cotton and its diversified products are not influenced excepting when there may be a limited amount of goods held by the mills or in the jobber's hands. On the contrary, however, if there is an abundance of manufactured goods on hand, the tendency of their value is downward owing to the large number of mills that manufacture the same class of goods and on which competition is sure to follow.

To show what the loss is to the manufacturer between the market value of the staple and figuring the gross loss that is customary of 15 per cent., the difference in the price as between 7 and 14 cent cotton is herewith illustrated.

Price per pound.	15 per cent. added.
7	8.05
8	9.20
9	10.35
10	11.50
11	12.65
12	13.80
13	14.95
14	16.10

The extraordinary conditions which developed during the seasons of 1903-4, which caused the price of cotton to advance, while it worked harm to the manufacturers, placed the cotton planter in an independent position. It also created a fictitious value, and it was only possible to maintain this high price on account of the necessity of many mills that had not bought sufficient cotton to supply their needs and were obliged to buy cotton in order to keep their organization together. The industry, therefore, was between two fires: the speculator and the jobber. The speculator knowing the necessity of the manufacturer, and the jobber in a position where he could afford to wait rather than pay the increased price for goods; and, if he did buy, it was only necessary to do so in small quantities and only in sufficient amounts to meet his immediate requirements. In a large measure this disorganized many large manufacturing plants, and brought about the necessity of curtailment or restricted output, and through this, a loss of many skilled operatives. No sympathy whatever was shown the manufacturer and it would seem to me that the encouragement given the speculator for quick returns in cotton futures and the advice given the farmers through their means, will be a detriment both to the planters and industries alike during a term of years.

While the southern planter several years ago was satisfied to sell his cotton around eight cents, today he looks for a price of ten cents or above; yet, it is not costing him in the same ratio to raise his cotton. And at the price, ten cents or more, the farmer is making more profit, without any trouble to himself or increased expenditure; while the manufacturer in order to spin

this cotton may have over a million dollars invested in machinery and buildings, and besides looking after the cotton interests must at the same time take care of the depreciation of the machinery, pay dividends, follow carefully the sale of his product, including many other details which the farmer has no conception of, or those who influence the results alluded to.

The suggestion made by our President at the semi-annual meeting at Atlantic City regarding the practicability of manufacturers combining and raising in part their own cotton, is worthy of careful consideration; and same led me to obtain from experienced planters the approximate cost to them for raising cotton. The figures vary, as would be expected, owing to the different ideas and methods; but for illustration the practical results are the same, and in each case, the planter admitted that if they could secure ten cents per pound for cotton for several years, the South would be in such a strong financial position that they could dominate and hold cotton at this figure.

The figures I herewith submit are as reliable as it was possible to get them. I will designate the several planters by letters; also allow 1,400 pounds of seed cotton to produce 500 pounds of lint, which was agreed upon by all as being a fair proportion. These figures are based on one acre for comparison.

A

Paid the following for 500 pounds of lint per acre:

$7.00	for fertilizer;
4.50	" cultivation;
7.00	" picking 1,400 pounds of seed cotton.
Total, $18.50	Cost per pound, 3.70 cents.

About one mile from planter A, planter B had twenty acres under cultivation and secured the following results:

B

Paid the following for 875 pounds of lint per acre:

$9.00	for	fertilizer;
4.50	"	cultivation;
11.45	"	picking 2,290 pounds of seed cotton.
Total, $24.95		Cost per pound, 2.85 cents.

B's land was planted in cantaloupes, followed by peas the previous season.

C

Paid the following for 400 pounds of lint per acre:

$6.60	for	fertilizer;
6.25	"	cultivation;
5.60	"	picking 1,120 pounds of seed cotton.
Total, $18.45		Cost per pound, 4.61 cents.

Planter C, also stated that if he had put $10 worth of fertilizer on his land he would have secured 600 pounds of lint per acre, and would have cost:

$10.00	for	fertilizer;
6.25	"	cultivation;
8.40	"	picking 1,680 pounds of seed cotton.
Total, $24.65		Cost per pound, 4.11 cents.

Planter C, also called my attention to a planter who had secured during the season of 1904-5, 70 bales from 37 acres, admitting at the same time that the cost to cultivate would be less owing to his land being in such a high state of cultivation.

D

Paid the following for 946 pounds of lint per acre:

$12.00	for	fertilizer;
5.00	"	cultivation; (estimated)
13.24	"	picking 2,648 pounds of seed cotton.
Total, $30.24		Cost per pound, 3.19 cents.

E

This planter believed in using an extra amount of fertilizer with this result:

Paid the following for 1,500 pounds of lint per acre:

$40.75	for fertilizer;	
4.50	" cultivation; (estimated)	
21.00	" picking 4,200 pounds of seed cotton.	
Total, $66.25		Cost per pound, 4.42 cents.

F

Is a practical planter and dealer from whom I obtained the following:

Paid the following for 571 pounds of lint per acre:

$12.00	for fertilizer;	
5.00	" cultivation;	
8.00	" picking 1,600 pounds of seed cotton;	
Total, $25.00		Cost per pound, 4.38 cents.

G

These figures were obtained from a planter in a section devoted to raising cotton, some planters having from 300 to 500 acres under cultivation. A great deal of land, however, was leased to tenants and they were not allowed to use less than $6.00 worth of fertilizer per acre, the average amount used costing $9.00 per acre, on which they produced one bale. Labor is also plentiful:

Paid the following for 500 pounds of lint per acre:

$9.00	for fertilizer;	
4.00	" cultivation;	
5.60	" picking 1,400 pounds of seed cotton.	
Total, $18.60		Cost per pound, 3.72 cents.

The above cost for picking is 40 cents per hundred pounds of seed cotton, and the figures are conservative as furnished by this planter. I believe that cotton can be raised in this section for three cents per pound.

H

The small planter who rents a farm, pays the following for same in the same section as planter G:

A one-horse farm includes 30 acres, 25 of which could be planted in cotton and the balance would produce corn and vegetables for family and stock; and, if a tenant, the land would cost $6.00 per acre for rent.

Paid the following for 500 pounds of lint per acre:

$7.20	for rent;	
9.00	"	fertilizer;
4.00	"	cultivation;
5.60	"	picking 1,400 pounds of seed cotton.
Total, $25.80		Cost per pound, 5.16 cents.

If a farmer raises 25 bales of cotton, his profit, if he receives 10 cents per pound for same, would net him 24.20 per bale and for 25 bales, $605.00. Allowing $50 for depreciation of stock and farming implements, his actual profit would be $555.00; and outside of flour and a few other necessaries, he has secured vegetables for his family and feed for his stock from the five acres which are included in the item of rent. At the same time, if his family consisted of himself, wife and several children, he would be under no expense for picking his cotton as they could easily do this and would add $140 to his profits.

I

Represents a very ordinary farmer (colored) who only cultivated his land three times, and obtained the following results:

Paid the following for 180 pounds of lint per acre:

$3.00	for fertilizer;	
4.00	"	cultivation;
2.51	"	picking 502 pounds of seed cotton;
Total, $9.51		Cost per pound, 5.28 cents.

J

Was an old and practical South Carolina planter. I became acquainted with this planter through his son, who called at my

office at Hope Mills, North Carolina. At the time he called I was having an interesting conversation with a gentleman in regard to the baling of cotton. I noticed that he was quite interested, and after the gentleman left the office I had a long talk with the young man about raising cotton and he claimed that his father, previous to 1894, had educated three sons, sending them to college, also completing their education abroad, on four-cent cotton. This, of course, seemed a strong statement to make, but I verified this man's claim by visiting his father in South Carolina and obtained the following information regarding the system under which he works his plantation:

1. Divided his land into one-horse farms of 35 acres, with ordinary house and sheds, on which no rent was charged.
2. Share cropped the working of same on cotton and corn.
3. Farmers (colored) planted approximately 22 acres in cotton, 8 to 10 acres in corn, balance in produce.
4. The planter furnished one mule and farming implements and one half the fertilizer for the cotton land under cultivation.
5. Cost to planter $10 per year for mule (average life of same 15 years) and $5 for tools.
6. Allowed $2 per acre for fertilizer, including cotton seed.
7. Three hundred and sixty-six pounds of lint cotton was produced per acre. On a basis of share cropping, he secured 183 pounds of lint without any cost to cultivate or for picking; he also owned his own gin.

Paid the following for 183 pounds of lint per acre.

	$1.00 for fertilizer;	
	.23 " farming implements;	
	.46 " mule;	
Total,	$1.69	Cost per pound, .0093 cents.

The profit to this planter per acre based on 10 cent cotton would be $16.47 or about 9 cents per pound.

The tenant, while producing enough to supply his family and stock, would realize the following amount:

183 pounds per acre, 22 acres = 4,025 pounds;
4,025 pounds @ 10 cents $402.50
22.00 for fertilizer.
$380.50 net profit.

This whole plantation was rented out to negroes, and the details were looked after by the planter who had an overseer to assist him, whom he paid a nominal wage with board.

By using an extra amount of fertilizer this planter said he could easily produce over one bale per acre, and had produced as high as two bales on land he had highly cultivated.

K

Bought 194 acres and paid $1,000 for same in 1902, which was covered with timber. Since that time the timber has paid for the original cost of the land and the wood now being cut pays for clearing and preparing the land for cultivation, which includes tops and undergrowth. In 1904 he brought 20 acres into cultivation, planting same in corn and peas.

In 1905 he planted this land in cotton and produced 500 pounds of lint per acre.

Paid the following for 500 pounds of lint per acre:

$4.00 for fertilizer;
5.00 " cultivation;
7.00 " picking 1,400 pounds of seed cotton.
Total, $16.00 Cost per pound, 3.20 cents.

This planter refused $4,000 for this land in its present condition with only 20 acres cleared for planting spring of 1906.

L

A mill farm of 20 acres which was planted in cotton produced 11 bales averaging 460 pounds each or 5,060 pounds of lint. This land was share cropped; the company paying for the fertilizer used, also one half the expense for ginning and seed for planting, old bagging and hoops were used on which there was no expense; there was also secured 30 bushels of cotton seed to each 500 pounds of cotton or practically 300 bushels.

Cost to company,	$98.50	for fertilizing 20 acres;
	6.88	" ginning 5½ bales of cotton;
	2.50	" seeds to plants;
Total,	$107.88	Cost per pound. 4.25 cents.

Realized for one half the crop or 2,530 pounds at 10 cents per pound, $253.00 and for 150 bushels of seed at 25 cents per bushel $37.50.

RECAPITULATION.

Received for cotton and seeds,	$290.50	
Expense to company,	107.88	
Profit,		$182.62
Profit per acre,		$9.13

The farmer received as his profit $290.50 less $9.30 or net $281.20.

About $5.00 per acre was spent for fertilizer as I did not know the value of same at that time although advised by the farmer to buy more, had we spent $8.00 per acre on this land I was assured we would have produced 500 pounds of lint per acre and I feel sure he was correct.

For 500 pounds of lint per acre, one half crop to company or ten bales we have the following result:

Cost to company,	$160.00	for fertilizing 20 acres;
	12.50	" ginning 10 bales of cotton;
	2.50	" seed to plant;
Total,	$175.00	Cost per pound, 3.50 cents.

Realized for one half the crop or 5,000 pounds at 10 cents per pound $500.00 and for 300 bushels of seed at 25 cents per bushel $75.00.

RECAPITULATION.

Received for cotton and seed,	$575.00	
Expense to company,	175.00	
Profit,		$400.00
Profit per acre,		$20.00

The farmer would receive as his profit $575.00 less $15.00 or net $560.00 as his share. The farmer could easily do his own cultivating and picking the same as he did with the lesser amount, and at 500 pounds per acre under the above conditions the profit to the company and farmer would net $960.00.

All the above figures were obtained from planters in states which are not considered cotton states, but further south in what is termed the "cotton belt" the land is more fertile and does not require the same amount of fertilizer; the cost of labor, however, may be somewhat higher. It should also be borne in mind that in the sections where staple cotton is grown the premium on this class of cotton would more than offset any excess in the cost to produce same; consequently the profit to the planter between the cost to raise and market his cotton would be greater than in the sections of the South, where upland cotton of seven-eighths to one inch staple is grown.

The intelligent planter of the South who follows all the details of his farm carefully, makes a greater profit on 8 cent cotton than one who receives 10 cents and is indifferent to the results that can be obtained by judicious management; and the actual conditions shown by the government reports indicate that such is the case, or there would be a greater amount raised from the millions of acres reported under cultivation, for the average yield from same is less than one half bale per acre.

An old and conservative southern planter makes the following comments:

"The most thrifty farmers in this and adjoining counties never hold cotton if it is above eight cents in the fall; I never hold it myself if above eight cents. The loss in weight, risk of fire and interest often runs about two cents. I consider the loss at least one cent per pound from fall to spring to those who hold cotton during the winter. Eight cents per pound right from the field pays as high a profit as any other annual crop. I have found it much cheaper to make a bale of cotton per acre by home made fertilizer than by any of the so-called commercial fertilizers, and many good farmers make a bale to the acre; and two bales can easily be produced per acre in the sandy loams of this section, which is much cheaper than cultivating four to six acres to

produce the same amount. Indolence is one of the greatest sins the southern farmer has to contend with, especially that of the negro, whom he has to depend on in a large measure for labor."

An extract from another paper regarding the cotton situation says:

"It is the purpose of the banks to back up to the full extent of their ability the efforts of the growers to prevent a catastrophe for themselves and the South; the bankers have made good and the growers are enjoying the benefits of broad minded liberality. The ability of the South to care for itself in the matter of its great crop was signally manifested during the past year. For that the farmer and many others more or less dependent on them may thank the southern banks."

I might add, however, that while the fluctuation in the price of cotton is brought about in a great measure by the speculators, the tendency of those interested in raising cotton, either financially or otherwise, is always to give the impression that the crop is less than the conditions warrant, the idea being to hold the cotton at its maximum price with the expectation that the longer they can hold it the better price they will receive. Other facts indicate this procedure, and it is becoming a fixed principle with the southern planter, and he also receives every encouragement from those financially able to assist him to do this in case he desires it. And, owing to the increased financial strength of the South, they will be more able from year to year to dominate and strengthen their cotton interests along these lines.

As the consumption of cotton increases, it will become imperative for the manufacturers to take steps to protect themselves and influence the planting of more cotton. Otherwise it will create an unsettled condition in the industry which will be as antagonistic to same as the unsatisfactory condition which has been the result of the fluctuations in the price of cotton. In order for the industry to continue to have a healthy growth, and to care for the increased number of spindles which will be yearly brought into operation, it will become necessary for either an

increased acreage to be planted in cotton or that more cotton be raised per acre to meet these requirements; and this cannot be accomplished except by a reasonable excess in the number of bales produced over what are consumed. Otherwise, there would be brought about in a series of years, the disturbance which happened throughout the manufacturing world in the seasons of 1903-4, the disastrous results of which have hardly as yet been entirely overcome.

GINNING AND BALING.

This matter was brought to your attention in my previous paper on Cotton Wastes* and the facts obtained at that time demonstrated that if the tare per bale was 23 to 25 pounds, this item of cost resulted in a profit instead of an expense to the planter; the gain is necessarily greater on all grades above strict middling upland cotton the price of which, we receive through the daily quotations from the New York cotton exchange, the above applies particularly to staple cottons owing to their greater value.

COTTON SEEDS.

I have not alluded to the value of this by-product in the raising of cotton to the planter; that it is a source of profit to him, however, will not be disputed and referring to it in my previous paper I merely stated the situation; that the products from the seed will increase in value is understood by those who realize its commercial advantage.

It is not to be expected that it will reach the value of the staple, but same is enhanced yearly by the many uses which the meal and oil is used for, it is also being exported which will not fail to increase its value. If a planter raises one bale per acre the cotton seeds from same will nearly if not quite, pay for his fertilizer, and eliminating this expense it reduces his cost to produce same in like ratio, or, adds to his profit after the sale

*Transactions New England Cotton Manufacturers' Association, Vol. 79, p. 237.

of his cotton. The per cent. referred to in Cotton Wastes* is practically correct and needs no comment; these figures were based on ten cent cotton, but at twelve cents the value per pound to the planter is approximately thirteen and one half cents.

The above figures create a wide margin between the cost of the raw cotton and the price which the planter has been trying to secure for his product.

SUMMARY.

The object of this paper is to bring before this Association of cotton manufacturers, the cost to produce their raw material as furnished me by the several planters whom I interviewed regarding the matter, and covers a large territory including North and South Carolina.

You will also note I have only given the actual cost to produce the cotton which includes all expense for fertilizing, cultivation and picking by the various planters; all of whom arrange to raise enough feed for their stock and produce for their family or hired help if they live on their premises, so as to eliminate the necessity of buying same and which they can produce more economically.

Interest on mortgaged property or assumed interest on borrowed capital to operate a plantation will not be included, as this item of expense was unnecessary to those who furnished the information; fixed charges including taxes, wear and tear on farming implements, depreciation of stock and buildings are legitimate expenses, an estimate of same can readily be made but the amount depends in a measure on the ability of the planter, same would be greater with some planters than others. This naturally applies to all lines of business whether it be in manufacturing or farming.

We will assume for illustration the possibilities of a one hundred acre farm, providing same is properly managed. The depreciation of such a property so far as the raising of its cot-

*Transactions New England Cotton Manufacturers' Association, Vol. 79, p. 237.

ton crop is concerned would amount approximately to sixty dollars a year.

It is not expected a farmer would plant the whole one hundred acres in cotton, but would divide same and raise enough corn and produce to feed his family and stock, this land should bear its proportionate expense in ratio to the number of acres planted in cotton.

To determine the possible results we will allow three to one planted in cotton as being a fair proportion, and under these conditions the total depreciation would amount to eighty dollars. The taxes on this land would approximate about fifteen dollars per acre, this, at ten dollars per thousand, would amount to fifteen dollars per year, and on buildings, stock and farming implements, if taxed for twelve hundred dollars would make the total taxes twenty seven dollars, the two items added together making one hundred and seven dollars, this seems a high estimate.

The earning capacity of this one hundred acre farm by raising one bale per acre of five hundred pounds each, at a value of ten cents per pound the average cost of which, as furnished by the several planters, is four and six one hundredths cents, this does not include the cost of producing cotton by planter J.

75 bales at 500 lbs. each 37,500 lbs. @ 10 cents,		$3,750 00
37,500 lbs. @ 4 6/100 cents per pound,	$1,522 50	
Depreciation and taxes,	107 00	
		$1,629 50
Profit,		$2,120 50

The above would be a profit on the cotton and there would have been secured from the balance of the farm, all the necessaries for family and stock. Another very important item, however, is the cotton seed, this at seven dollars and fifty cents per bale added to the receipts for cotton, nets the following income:

Profit on cotton,	$2,120 50	
75 bales of cotton @ $7.50	562 50	
Profit,		$2,683 00

Incidental expenses, such as shoeing mules, repairing wagons and general repairs would not add under any circumstances more than one hundred dollars to the expense of operating a plantation of one hundred acres.

It is not to be expected that all southern cotton planters earn the amount as set forth in the figures submitted, but that many are doing this will not be disputed. Has the whole cotton industry, therefore, to suffer on account of the indifferent planter who does not secure a good crop on account of indolence? This is very aptly referred to in another part of this paper.

The importance of the cotton staple is not realized by the average planter, neither does he know anything in regard to the magnitude of the industry which it has created; he is, however, learning rapidly the value of eleven or twelve cent cotton and the profit which accrues to him when sold at this price.

From the general trend of the southern planter's position and those whom he deals with, they seem determined to waive the just rights of the manufacturer, and are exercising every effort to secure a high price for the staple; this is being done by thorough organization and faith in those who realize the advantage in regulating its supply so as to obtain the maximum price for the great staple "cotton".

COST, EQUIPMENT AND ESTIMATED EARNINGS, ON A COTTON PLANTATION OF 1,000 ACRES.

1,000	acres of land @ $40,	$40,000 00	
	200 acres uncultivated; 800 under cultivation; 700 in cotton; 100 in produce and feed.		
10	Houses and sheds,	3,000 00	
20	Mules and harnesses,	3,000 00	
10	2 horse wagons,	400 00	
10	2 horse plows,	70 00	
10	Cotton planters and fertilizer distributers,	150 00	
10	Sulky cultivators,	180 00	
	Hoes, Rakes, etc.,	50 00	
	Miscellaneous,	250 00	
			$47,100 00

COST TO PRODUCE COTTON.

Overseer and assistant,	$3,000 00	
Fertilizer $9 per acre,	6,300 00	
Cultivation $4 per acre,	2,800 00	
Picking $7 per acre,	4,900 00	
		$17,000 00
		$64,100 00

AMOUNT PRODUCED.

700 acres, 1 bale per acre = 700 bales, 500 lbs. each = 350,000 lbs. @ 10 c. =	$35,000 00	
Cotton seed @ $7.50 per bale =	5,250 00	
		$40,250 00

RECAPITULATION.

Received for cotton,	$40,250 00	
Cost to produce,	17,000 00	
Profit,		$23,250 00

$23,250.00 divided by $17,000.00 = 136 per cent. over the expense to produce.

$40,250.00 divided by $64,100.00 = 62.79 per cent. on outlay.

Cost per pound,	4.86 cents.	
Depreciation and taxes,	.67 "	
Total cost,	5.53 "	per pound.

On a 1,000 acre plantation the fertilizer materials could be secured, and the fertilizer made for one half the expense of the cost of commercial fertilizers, which would give the following result:

Cost, equipment, etc.,	$47,100 00

COST TO PRODUCE COTTON.

Overseer and assistant,	$3,000 00	
Fertilizer $4.50 per acre,	3,150 00	
Cultivation $4.00 "	2,800 00	
Picking $7.00 "	4,900 00	
		$13,850 00
By owning gin and ginning and baling this cotton it would save 80 cents per bale,		$560 00
Net,		$13,290 00

AMOUNT PRODUCED.

700 acres, 1 bale per acre = 700 bales, 500 lbs. each = 350,000 lbs. @ 10 cents =	$35,000 00	
Cotton seed @ $7.50 per bale =	5,250 00	
		$40,250 00

RECAPITULATION.

Received for cotton,	$40,250 00	
Net cost to produce,	13,290 00	
Profit,		$26,960 00

$26,960.00 divided by $13,290.00 = 203 per cent. over the expense to produce.

$40,250.00 divided by $60,390.00 = 66.65 per cent. on outlay.

Cost per pound,	3.79 cents	
Depreciation and taxes,	.67 "	
Total cost,	4 46 "	per pound.

SUMMARY.

1,000 ACRE PLANTATION.

Cost to buy and equip 1,000 acres,	$47,100.00
Cost to produce 350,000 pounds,	17,000.00
Profit on 10 cent cotton including seeds,	23,250.00
Profit on 8 cent cotton including seeds,	16,260.00
By making fertilizer add extra profit,	3,150.00

100,000 ACRE PLANTATION.

Cost to buy and equip 100,000 acres,	$4,710,000.00
Cost to produce 35,000,000 pounds,	1,700,000.00
Profit on 10 cent cotton including seeds,	2,325,000.00
Profit on 8 cent cotton including seeds,	1,625,000.00
By making fertilizer add extra profit,	315,000.00

The PRESIDENT. Several gentlemen who are with us have been studying this question for the last few weeks, and I shall be very glad to hear from them. May I ask Mr. GREG, one of the commission of English spinners to favor us.

Mr. HENRY P. GREG. May I first of all express on behalf of myself and fellow members the very deep sympathy which we feel toward all Americans in the terrible disaster which has overthrown the beautiful city of San Francisco. It is the one dark spot in our otherwise most enjoyable trip that we should have heard of this awful calamity during our travels in the South. May I also thank the New England Cotton Manufacturers' Association most heartily for the hospitality that they have extended to us. As soon as ever we landed we were met at the pier with a friendly smile by your Secretary, Mr. WOODBURY, who had sent us a letter of greeting by the tug which met the steamer in the outer harbor, and we felt that we had jumped right into the arms of friends without need of any introduction.

Well, gentlemen, thanks to the kindness of everybody, we have had a most remarkably interesting tour. I am not going to make any report to you, because, as you know, we have been sent over to this country to inquire into various matters, and if I were to attempt to tell you what we had seen or what we had

learned we might find that some of our friends on the other side would tell us that if they had another commission to send over here they would not send us, and I do not want to run the risk of offending in any shape or form our friends who have entrusted us with this important mission on the other side. But I think I may say a few words without divulging any secrets.

In the first place, we thought when we went South that we were not by any means going to a land of darkness, but a land of considerable indifference to the needs of the cotton spinners and manufacturers. We have come back I think, alive to the fact that there are in the South a great number of people who are most anxious to cultivate cotton under the best possible circumstances, to gin it with the least possible damage and to bale it in the best possible form. We found that there was a spirit of keen desire to meet the legitimate requirements of the spinners and manufacturers of the world. The only thing that we felt was that hitherto the growers and the spinners had not been in quite close enough relation to each other. Everywhere our visit was welcomed, and it was with great satisfaction that we had with us for most of the way your most estimable president. I only wish that he had been accompanied by as large a gathering as was our chairman, Mr. MACALISTER, because the importance of the grower and the spinner getting into closer touch cannot be exaggerated. For instance, the people who are chiefly striving to improve the ginning are, I may say, quite out of touch with the people who are keenly striving to improve the machinery in the picking room; I urged upon two or three of these to try to get into communication with the people who are striving to make improvements in the picking room, because really, though the distance between the cotton fields and the mills is in many cases to be measured by thousands of miles, yet the cotton practically has to go straight from the ginning to the picking room, and to my mind it is most important that the cotton should be so ginned that it should be in the best form possible for the picking room, and I do not see how that is to be achieved unless the people who are striv-

ing to improve the ginning do as I propose. I understand that at Washington on the first of May all those who are interested in the growing, spinning and manufacturing of cotton will meet together, and I hope that there will be a great deal of exchange of views on that point.

Then, I think I may, without divulging any secrets, urge very strongly indeed that the New England spinners can get really into closest connection with the cotton growing interest by establishing their own plantations in the Southern States. I do not urge that only on the ground of making money. Mr. WILLEY has drawn a magnificent picture of the money that could be made in growing cotton, and there is no question whatever that at ten cents plenty of money can be made in growing cotton. But I would urge far more that you should start plantations because it would enable you to show other planters how you wanted that cotton ginned and baled and marketed. It would bring you in very close touch indeed with the actual problems of growing cotton, and your plantations would be in the nature of exhibition or experimental plantations, which would be of incalculable value throughout the cotton belt. I do not think the cost of such a plantation would be very large. There is no doubt there would be no great difficulty in finding a location for such a plantation. But I am quite certain that the value that the New England cotton spinners would receive from such a plantation is absolutely incalculable.

Another point in this connection: If you were to establish plantations in various parts of the cotton belt, you would be able to get extremely reliable information with regard to the weather in the cotton belt, and after all, the weather is one of the most important points in connection with the growth of cotton, and I believe that if you had your own stations, and your own men reporting upon the conditions of the weather, you would be able to form a more accurate estimate of the cotton crop, a truer estimate than even you get by the government reports.

While on that point may I say that I think that in that way you would probably do more to eliminate the speculator than by adopting any other course. The speculator is the man, who as a rule, is a little bit sharper than most of us. He sees his chance and he takes it; we see the chance and think if we wait a day we shall have that chance offered to us again. If the spinners of New England could get this information privately from their various plantations, I think they would get the chance of seeing what the market was going to do and what the crop was going to be before the speculator, and in that way I think they would have a very great chance of neutralizing the effects of the speculator.

I do not know why your President so kindly called upon me to address you unless it be to give on behalf of those who are with me the opportunity of thanking everybody we have met in the States, — and we have met many, many hundreds — of thanking them all for their extraordinary kindness and hospitality. If we have learned nothing else we have received such lessons in the way which hospitality should be shown to strangers as I trust we shall never forget. I do not know how we can possibly apportion our gratitude. Everyone that we have met, right through from Boston back to Boston, has been as kind and as considerate and as hospitable as it was possible for them to have been, and we feel from the way the New England Cotton Manufacturers' Association met us on our arrival that we shall always have a very warm place in our hearts for them and we trust that in the future there may be more chances of communication between the spinners of the old country and the new. [Applause.]

The PRESIDENT. Are there any remarks on this question that we have been considering? If not we will proceed to the next paper, Wider Markets for American Goods, by Mr. C. A. GREEN of New York.

WIDER MARKETS FOR AMERICAN GOODS.

C. A. GREEN, 290 Broadway, New York City.

Wider markets for American goods is a subject that is receiving more attention at the present time than ever in our history, and rightly so, for it is a matter of vital concern to every manufacturer in the country, whether the product of his particular mill or factory can be exported or not.

The cultivation and extension of our foreign trade is vastly important in its bearing on our home trade, as it is always the unsold balance, however small it may be, that demoralizes the market. For that reason, if for no other, all should have an active interest in the efforts now being made for increased sales of American goods abroad, even if we cannot agree as to methods.

There is more to consider than the sale of a few goods, this year or next. The time is not far distant when the need of foreign markets will be more pressing than at present, and it will be harder to get a foot-hold. Our competitors are on the alert, and allow no opportunity to pass where it is possible to secure a stronger grip on the trade.

Mr. JAS. J. HILL, who, as a practical economist, has no superior in the country, in a recent speech at St. Paul, said, after speaking of the great development that would surely take place in this country during the next twenty or twenty-five years, "that we must increase our foreign trade in every direction, or

suffer grave consequences in the future. When we must have large sales abroad, or have an army of idle men at home." I would emphasize one part of that, especially, "in every direction," not giving our attention to a few markets where it seems comparatively easy to sell and where some one else has done the pioneer work, but study the whole field, know the requirements and conditions, so that if a boycot may be instituted in one country, or a war break out in another, you may be able to take advantage of those very conditions in some other part of the world.

This organization has listened to many admirable addresses on foreign trade, the desirability of increasing its volume, and the requirements of the various markets. Pages of statistics have been quoted showing the imports of other countries, and our share, great or small.

Your trade papers have discussed the problem until it would almost seem that there was nothing more to say, but while it is an old subject, still it is too important to ever become stale.

I shall not try to add to your store of statistical data, but call your attention to some points which seem to be worthy of your consideration. I may, and no doubt shall, mention many things that you know as well as I, but familiar facts are oft times lost sight of, and need to be recalled. I do not agree with the sweeping criticisms of our manufacturers frequently made by writers who take up the subject of foreign trade in our newspapers and magazines. It has become quite a fad to say that we pack badly, do not give attention to orders or shipping instructions, and are generally a bad lot. Many of these writers have taken their cue from our Consuls, who have found it necessary to call attention to these matters in the past and to special cases now and then (and much is always made of our faults and short comings). It should not be applied to our manufacturers as a class. In fact, American goods as a whole, are today as well packed for over-sea shipment as those of any of our competitors, except some cotton goods to China which the special commissioner there has pictured in one of his re-

ports; in that you have room for improvement. There is no mystery about packing for export, simply become familiar with conditions under which your goods are handled and your packers need have no trouble on that score. While we may be on the wrong side sometimes, do not line up with some I have heard, and say there seems, from reports, to be so much extra trouble in packing for foreign shipment that we would only get into trouble if we tried it. Don't assume for a moment that we are the only offenders.

Only a short time ago a leading English trade paper warned its readers that they would lose trade in certain markets if they did not come up to the American standard of packing, and cited many classes of goods that were not only put up in a more attractive form, but reached their destination in far better condition than the English. If that is the fact in some cases (and I have seen many proofs of it myself) it can be in all, with proper attention.

General inattention on the part of those who are ***really seeking to build up their foreign trade*** is also unjust. They are made to suffer for the sins of the man who sees nothing more in export trade than an opportunity to unload some surplus stock when trade is dull at home, and should not be termed an exporter.

His class is a drag on our progress abroad, and I believe that no firm should allow their name to go before the buyers in other countries until they have made up their minds to make a serious effort to introduce their goods and to meet the requirements of the trade. One of our Consuls, in writing on the need of the individual manufacturer in his foreign trade, says, "Probably his *first* need is to convince himself that he really wishes to engage in foreign trade. The American manufacturer will go to his annual convention and vote for resolutions about foreign trade; he may have some vague notion that the government ought to bring foreign trade to his very door; he will write to Consular offices for addresses, and he will go abroad to obtain rest, but only in exceptional cases will he take the time to seek knowledge about his own private business in the foreign markets

in which he might sell his wares." This may sound a bit harsh, but there is much truth in it. He goes on to say, "The great signal successes of American manufacturers in the Old World have been made by firms who have simply extended their domestic operations abroad, applying American methods in their own way. There is very little that is mysterious about foreign trade, yet American firms which will set up branches, without hesitation, 3,000 miles from their bases in the United States, see something exceptionally difficult about doing the same thing abroad."

We must keep in mind the fact that this man is at the other end of the line, and has no risk to assume, but it is also true that a personal knowledge of a market and its requirements is the best possible guide for action and the best methods to employ to secure results.

Our government, through the Consular service, (which is showing marked improvement in efficiency) is doing much practical work in the way of trade investigation and finding new markets, but it remains with the manufacturer himself whether these markets shall be *secured* or not as permanent outlets for American products. Still greater good can be accomplished when proper support is given, and better prospects offered trained men in the service. Every one who gives a thought to the subject sees that reforms are needed to bring the service up to the standard hoped for, and I believe there is just one way to do it, and that is for you manufacturers and business men to take hold of the matter in earnest, making it very plain what you want. Surely the valuable work that is being done under the present conditions, (which is frequently commented on by other countries) is sufficient evidence of the possibilities for good under improved conditions.

The special agents sent out by the Bureau of Manufactures have done excellent work. You have, no doubt, read with interest and profit the reports from China where special attention has been given to your own line of goods, and a more thorough investigation made of the needs of that market than

has ever been undertaken before. A few weeks ago I had an opportunity of examining a large number of samples of popular lines of textiles used there, which after a good deal of trouble, have been gathered in that field, with all data, showing how they are put up to suit the tastes of the trade and the prices at which they are sold.

These samples, I am told, are at the disposal of any manufacturer that may be interested, on application to the Bureau of Manufactures at Washington. This is one of the lines of work undertaken by the government for the advancement of our commerce in that part of the world.

All this of necessity must be general in its character. Direct personal work by the manufacturer or his agent should be done if any great results are to be secured. Special commissions may be sent out, Consular officers and agents may do their utmost, samples of what you may have to meet in competition may be gathered, which are of great value, in that you may be posted on conditions and requirements, but all this will not sell your goods in quantity. Our foreign trade can only become great when the manufacturers take hold of the matter themselves, then, and only then, will we take the place that rightly belongs to us by virtue of our skill in manufacturing.

That is recognized by some of our competitors, as it has been said that Americans will not be formidable competitors in the world's markets until they are as smart in selling their goods as they now are in making them.

Manufacturers have sometimes said to me that they don't see any great need for foreign trade, as the *home trade* is good enough for them, that there is no trouble about it, it pays well, etc. That is all very well, but there is such a lot of fellows that think the same, and the day will come in the not distant future when there will not be enough to go around. Then what?

It is unwise to assume that when we feel the pressing need for more foreign trade that we have only to announce the fact and it will come to us. We may then find, and doubtless will, the English and Germans so strongly entrenched in the market

that it will cost much time and money to get any great share of the trade, and a small share will not then suffice.

The time to make connections is now, while the need is not so great. If either market is to be a little neglected, let it be the home. You can get at that quickly. The foreign takes time, whether it be in South America, Africa, Australia, or the great market of the Orient, which cannot be hurried, where you must pace with them. One does not have to stay long in the far East to appreciate those lines of KIPLING'S:

"It is not good for the Christian's health,
To hustle the Aryan brown;
For the Christian riles, and the Aryan smiles,
And he weareth the Christian down;
And the end of the fight, is a tombstone white,
With the name of the late deceased,
And the epitaph drear, 'A fool lies here',
Who tried to hustle the East."

Many, not understanding this fact, score a failure in their efforts to secure business there, American fashion, and give up, leaving themselves at the mercy of an English or German firm who only gives their goods such attention as to his own personal gain dictates. The American manufacturer being almost or entirely unknown to the buyer, while a knowledge of the conditions and persistent effort would have established the goods permanently in the market.

This lack of persistency on our part is not all understood by our friends abroad. I have had it said to me scores of times by business men in foreign countries, "we don't quite know whether your people want to deal with us or not, just as we begin to feel that we are getting acquainted with them, we don't hear from them any more." Mark the difference: the English or the Germans never let it be forgotten that sometime they expect to do business with them, and the latter, I am inclined to think, are to be our most important competitors for the future.

One of the leading papers of London devoted to export trade, only a short time ago, published a letter from one of its special

correspondents on trade in China, in which he said: "Only by efficiency and organization can we hold our own in awakened China. Let our business men at home send out men with a thorough knowledge of their work to look after their interests, and do not let them think that *anybody* is good enough to send to China. There is nobody quicker than a Chinaman to see that a man is not a master of his business, and to take advantage of the fact. Another golden rule that it will be well for our manufacturers to work to, is: 'Trust not to agents.' If you think the trade worth getting, go for it yourself. The agent in China has probably agencies ranging from wines to coal, and piece goods to machinery, with no adequate knowledge of any one line." After commenting on the fact that many English manufacturers are doing business through German firms, he says: "The average merchant in Shanghai is quite content to sit down and wait for the business to walk in, whereas the Germans seek it and establish branches in the principal business centres. He comes to China for business, and does not give his time to anything else."

All this applies with even greater force to the American. Few of our goods, when sold in that market, are the property of our people.

The activities of the Germans are not in any way confined to China. The rapid development of their trade in India is the subject of a lengthy report recently issued, which shows an increase of one hundred per cent. in the last ten years. The report concludes with the statement that German firms, particularly in Hamburg and Bremen, are exerting themselves to extend their trade in that country.

They are equally active in South America, Africa, Australia and elsewhere; never waiting for the trade to come to them, but seeking it always.

Our Consuls are constantly reminding us of the progress *England* is making in the world's markets, and the reason is not hard to find. Her manufacturers are doing the same kind of

work that you find most effective at home, *i. e.*, making personal efforts to secure business.

Doors seem to be open for us in many directions. It would take too much time to try to mention many near and far. Brazil for instance, as large as the United States, with one third of the population of South America, is practically dependent on foreign manufacturers, but the English built what railroads there are; Germans and Canadians dominate the street railway situation; Portuguese, Spanish and Syrians hold the retail trade, and the French set the fashions in dress and thought.

Nearly half of the money that enters Brazil comes directly from the pocket of the American importer and goes as directly into that of German, English, French, Belgian, Argentine and Portuguese exporters.

Brazil finds in us a market for almost fifty per cent. of her total exports. She sends us yearly from six to eight million bags of coffee. It is exported by German houses; carried on English, German and Belgian ships; and paid for through London bankers. As in Brazil, so in the remaining Republics south of the equator. Save where special industries have forced them, we see practically nothing but kerosene and codfish. We know them only through their international and internal disturbances, consequently we know least of the most conservative, peaceable and promising among them.

Take the Argentine with her progress and buying capacity: a very recent special report on that country says: "In the matter of adaptability, of suitability to local needs and requirements, American goods, in nearly a hundred lines, make an appeal to the Argentine buyer that is altogether exceptional and unlike anything proffered by those from Europe.

In Buenos Ayres there are a million people, and there is a living, moving and intelligent representation of the world's best efforts and the world's best results.

After commenting on the products of our mills and factories displayed in that beautiful city of the South, the writer laments the fact that so large a percentage of them reach that market

through London, and that the American personal element is almost entirely lacking.

So I have found it in Australia and Africa, from my own investigation. All honor to the few American firms in those countries who are doing much to advance our interests and handle many lines of goods. Their efforts should be supplemented by more active co-operation on the part of the manufacturer.

Another important factor in extending foreign trade, and one mentioned by almost all writers on the subject, as well as in every special report made, is "Credit". We are told that we cannot succeed in a large degree until we are willing to trade on the same terms as other nations. That it is unfair to ask a merchant abroad to put up his money in advance, take the risk of delivery, and the carrying out of contracts. It is all very well for us to say there is no risk in that,—that we will do what we agree to do. That is exactly the position the foreign merchant takes when he asks for the same terms that are acceptable to the exporters of other countries.

Just a few days ago I saw a report from a Consul at an important post who said: "There are no American manufacturers who sell on credit—they even make difficulties in selling goods, payable at destination, against delivery of shipping documents."

"American manufacturers insist upon always being paid in advance, and sending the goods afterwards. From the fact that European manufacturers allow credit, and have men in the field to represent their goods, they are selling at even higher prices, goods that are not so well made as the American."

I could quote you instances of this kind by scores, only varying according to local conditions, but telling the same story. This question of credit has been a very serious obstacle in the way of a more rapid development of foreign trade, one that many of our manufacturers are beginning to recognize themselves, judging from statements made to Consular officers sometimes, to the effect that they do not know to whom it would be

safe to ship goods payable on arrival. It is really a very simple proposition, apply the same methods you would use at home, under similar conditions.

The handicap of the past in this particular has been removed. Banking connections are being constantly improved and extended, and it may not be known to all you, that keeping step with the progress of time, the mercantile agency, R. G. Dun & Co., have opened branch offices in all the commercial centres of the world; fifty-four of these are now in operation, outside of the United States and the American manufacturer is thus able to meet his European rival on an even footing.

If we are to trade with the world, and we must, we must have all the appliances to carry on that trade successfully.

With improved banking facilities it makes little difference whether the draft is on Hong Kong, Cape Town, Buenos Ayres or Chicago. There are just as good firms to deal with in one part of the world as another.

There is no question whatever about increasing the sales of American goods abroad to a very marked extent if our manufacturers choose to do so.

The government is doing all it can with the facilities at its disposal to increase our trade and to find markets. Much is being done by trade organizations to stimulate interest. We have trade journalism without an equal in the world, but all of these instrumentalities, if absolutely perfect, cannot accomplish the work unless followed by practical efforts of the manufacturers themselves.

The PRESIDENT. The last paper on the programme for today is Cotton Prices and Wool Prices, by Mr. FRANK P. BENNETT, Jr., of Boston.

COTTON PRICES AND WOOL PRICES.

FRANK P. BENNETT, JR., Boston, Mass.

The factors which make the market price of any commodity are always interesting, for they determine quite the most exciting games of chance that the world can know. The most stable of businesses, the industries which are dependent upon the most careful attention to detail and the most scientific manipulation of component parts, are often the ones in which, in the end, wise judgment in a speculative crisis, the quick decision of a moment, can bring to full success or entirely undo all the careful work of a long period. It is so with your industry. There is no line of business in which a greater regard for accuracy is required. The cotton mill under competent management is scientifically the most perfect mechanism that one can find. Its success depends upon the careful adjustment of a host of factors, good help, good raw material, a wise choice of fabrics and a wise supervision of the whole. Yet it is true that in the end the purchase of raw materials on the wrong kind of a market or the sale of goods at similarly inauspicious occasions can turn to naught in the briefest possible space of time all the elaborate calculations and painstaking care of years. It is for this reason that any study of the factors which go to make up the market for cotton and the market for cotton goods is justified. I invite your attention for a few minutes to certain factors which may or may not underlie the market for cotton goods and the market for raw cotton at the present time.

Those among you who keep in close touch with the market for raw cotton may remember the striking advertisement inserted in the newspapers the last part of last September by one of the most daring bull operators whom the cotton market has ever known. It specifically drew a parallel between the situation in the market for wool and the situation in the market for cotton. If one were inclined to be suspicious he would even then have noticed that the operator in question did not actually argue that because wool had acted in a certain way cotton was bound to do something that was similar, but the conclusion was unavoidable that he believed there was a lesson for the cotton user plainly written in the action of wool prices, that, in short, there was a hand writing on the wall, and this is the argument which he advanced: Wool had advanced 400 per cent. within two years and was still advancing, yet so little had this deterred buyers of clothes (who in the end of course pay for every advance in raw material cost) that our woolen manufacturers were still able to do business in competition with the manufacturers of Europe and their less expensive labor and were even bidding against European manufacturers for wool in their own market. To this the advertisement added the fact that cotton was being well bid for by Europeans in our market. The conclusion seemed to be that cotton must go up.

A GREAT ADVANCE IN WOOL.

Now all this appears more convincing as one studies it rather than less. It is absolutely true that few mills are users alike of cotton and wool. The two businesses of cotton manufacturing and of woolen and worsted manufacturing have become quite distinct. The machinery for the work is different, the ability to manage successfully either the financial or the mechanical end of a cotton mill is often quite different from the ability required for the same work in a woolen mill, and yet the conditions which surround each of these two industries are not really dissimilar. The market price of wool is made by exactly the same factors as the market price of everything under the sun — supply and

demand. The price of cotton is made in the same way. Now there has been a tremendous advance in the price of wool, an increase, so the advertiser said, equivalent to 400 per cent. Assume that this has occurred without any great decrease in the supply of wool and the conclusion is inevitable that this advance is due to a greatly increased use of wool, a use which has been so importunate, so insistent, so absolutely irresistible that it has driven prices up, up, up, to this well nigh unprecedented figure. This irresistible demand is the graphic expression of an immensely increased use of woolen fabrics.

If you admit the soundness of this argument, and it is very easy to do so for the fallacy in it is not readily discoverable, one is unavoidably driven to the conclusion that cotton, too, is entitled to sell on the best basis for years. A tremendous increase in the demand for woolen and worsted fabrics is bound to be accompanied by an almost if not more than equally increased use of cotton goods. The demand for clothes is the best barometer of commercial prosperity that we have, better even than the demand for steel and iron. The demand for those products measures business enterprise and speculative activity rather than prosperity. The demand for clothes varies directly as family purses are stout or slender, that is, according as prosperity is real and general or mainly speculative, and when the family can afford to buy woolens, you and I know they can afford to and do buy cotton goods in even larger degree because they are cheaper. Why then, from the argument advertised by this bull operator, could not one draw a most astounding evidence of a need for cotton?

The whole trouble with this sort of argument is discovered in a brief analysis of the present situation in wool. I know you will pardon me for interpolating in this cotton manufacturer's meeting such a study, because it has a very direct bearing on a recent attempt to bull the cotton market. It has an interest in and by itself, however, for it reveals one of the most striking phenomena of modern commerce. In the face of the world's constant enlargement in population, in spite of the consequently

increased need of wool, the flocks of sheep in the world have been undergoing the greatest decrease that has ever been known.

WOOL GROWING CENTRALIZED MUCH AS COTTON GROWING.

Perhaps most of you do not know, although your President and others of your members who combine worsted manufacturing with a cotton manufacturing business do, that the wools of the world are tending to become, like cotton, the product of only two or three countries. It seems to be one of the tendencies of civilization for countries to specialize in those products for which they have particular aptitude. Just as we have won for ourselves the business of raising for the whole globe three-quarters of all the cotton it uses, we have succeeded in establishing ourselves as growers of one-eleventh of all the world's sheep. We do not begin, however, to supply our own needs for wool and are large purchasers in the markets of London, Liverpool and Melbourne. Last year alone, we imported 247 million pounds, or practically as much as the 300 million we ourselves raised. In short, even the dependence of this country, which usually boasts that it is self sustaining in every way, is firmly established. We too have to go to the strictly wool countries of the globe for raw material.

And what are the strictly wool countries? The apparent answer is of course Australia, first of all, and then Argentina and the Cape of Good Hope region of South Africa and as a matter of fact not less than forty per cent. of all the world's wool does come from these three sections. Moreover, as time passes this percentage is almost certain to grow. People are almost certain to look for the major part of the wool of a few years hence to these same sections and it is hardly debatable that sooner or later the very condition which our European friends cry out against in the cotton industry, the dependence of the whole manufacturing world on the weather conditions and the popular feelings and whims of a single great section, will be duplicated in woolen manufacturing. It is equally beyond dispute that the recent high prices for wool, so high indeed that

already certain smaller mills have been caught in a maelstrom of business disaster and failure, have been due to the very phenomenon which causes high prices for cotton, a seriously diminished crop of the raw material in the sections which grow for the world.

It was in 1901, soon after I had finished a term of apprenticeship in the sorting room of one of the world's biggest woolen mills, that wool sunk to the lowest figure it has touched since the Dingley tariff was enacted. Fine medium territory wool, the basic wool chosen by every one as the measure of the market, was down to 38 cents per clean pound as against 42 cents, the lowest figure previously reached since 1897, and as against the price of 60 cents reached in the boom which culminated in 1899. Of course it was not expected that this low figure would be long continued. The wool market and cotton market are constitutionally erratic. They are hardly in good health if the slough of despond is not followed almost abruptly by the mount of prosperity. So when wool began once more to rise, and by the close of 1902 was at 48 cents, or ten cents per pound higher, no one felt that anything out of the ordinary had occurred. But when the market kept on rising, and seemed to forget its duty to be erratic, or at least was erratic all one way and that toward higher prices, until in the summer of last year this same fine medium which in 1901 had sold at 38 cents per clean pound was moving freely from dealer to manufacturers' buyers at 70 cents to 72 cents, with some of the best judges willing to take on long lines at that figure, it was realized by every one interested in wool, whether they were keen observers or not, that there were underlying conditions at work on the wool market, which only a few had discovered and of which only the cleverest had been able to take advantage. It was at this stage that a hint from a well-posted quarter led me to Washington, D. C., in search for the underlying conditions.

AN INVESTIGATION AT WASHINGTON.

I shall not take your time to tell the many interesting features of this search. All of the wealth of statistical matter which

the government has accumulated in the painstaking way which characterizes its work of the last few years was placed at my disposal. I was allowed to roam through works to be found almost nowhere else in the world. Many were in foreign languages, but the same courtesy which had granted me entrance was extended to a kindly oversight of attempts at translation of manuscripts not readily intelligible to one whose French and German are learned in the schools, and the result of my work was a surprise even to myself. I had known that Australia had suffered a serious diminution in its flocks from drought and other causes, and that in New Zealand, the cross bred section of Australasia, canning factories had helped natural causes to decimate the flocks. But the extent to which this same diminution had spread over the whole world was honestly astounding. Let those of you who make statistical studies of cotton imagine for a minute what would have happened if the cotton crop of this country in 1905, instead of having consistently advanced ever since 1895, had actually decreased to one-seventh less than it was in 1895, suppose there had been no great crop meantime like that of 1904 to relieve the situation, and suppose that this decrease in this country had been accompanied by a like or greater decrease in Egypt and India and all other cotton sections of the entire globe. It is too horrible to imagine, and yet that is almost exactly what has been happening in wool, for the decrease of some forty-five million sheep which has occurred in Australia in the last decade has been matched by a decrease in every single continent, in North America of about five millions despite a friendly tariff, in South America of at least three millions, in Europe of no less than a dozen millions, in Asia of about three millions, and in Africa of over four millions; and nature's corrective influences have hardly as yet got in much effective work, in spite of the needs of new mills without number and the great increase in consuming power which is occurring throughout the globe.

May I insert here some tables bearing out my conclusions given above? The only explanations necessary to accompany

them are that in each case the sheep of China are not included, no figures being available, and that Asiatic Russia has been counted with Europe instead of with Asia, for the reason that the figures could not well be obtained in any other shape:

World's Flock of Sheep in 1895.

North America,	51,223,983
South America,	102,847,134
Europe (including Asiatic Russia),	198,184,214
Asia (except China and Asiatic Russia),	21,951,752
Africa,	31,890,052
Australia,	120,770,000
	526,867,135

World's Flock at Last Clipping Time.

North America,	46,799,999
South America,	99,998,513
Europe,	186,871,991
Asia,	19,043,711
Africa,	27,452,722
Australia,	74,800,000
	455,046,936

The decrease for the world herewith revealed is almost 72 millions or about one-seventh of the whole clip of the world of 1895. This decrease is nowhere near accounted for if one watches only the principal wool countries. It would never do to base a world boom in wool, such as now exists, on anything less than a summary of a world situation. And what do we find? That the decrease in the number of sheep in countries rarely regarded as wool sections is no less than 25 million head as against 54 million in the chief wool countries and that the decrease of the world is barely kept from being 79 millions instead of the 72 millions it is, by some unexpected increases turning up like, for instance, that of a few millions in Algeria.

I would like to go on with a running account of some of the information I brought to light, but the unrestrained way in

which I have already used your time leads me instead to insert here a table showing some of the striking decreases in sheep in various countries.

SHEEP IN VARIOUS COUNTRIES.

Australia (*including New Zealand and Tasmania*).

1871,	49,773,584
1881,	78,063,426
1891,	124,991,920
1901,	92,358,824
1903,	73,652,026
1904,	74,880,000

Cape Colony.

1891,	16,706,106
1898,	12,639,992
1904,	11,818,829

Orange River Colony.

1890,	6,619,992
1903,	1,437,258

Algeria.

1900,	6,723,952
1903,	8,958,537

India.

1892,	20,659,660
1903,	17,751,096

France.

1898,	21,277,582
1903,	17,954,230

Germany.

1860,	28,016,800
1883,	19,189,700
1897,	10,866,800
1900,	9,692,500

Great Britain.

1874,	30,313,941
1901,	26,377,200
1904,	25,207,178

Ireland.

1874,	4,437,613
1904,	3,827,884

Russia in Europe.

1877,	51,822,238
1888,	44,465,454
1903,	49,224,000

Russian Poland.

1888,	3,754,665
1903,	2,295,900

Spain.

1895,	16,469,303
1903,	13,359,473

Norway.

1891,	1,417,524
1900,	998,819

Argentina.

1895,	74,379,562
1900,	80,000,000
1904 (estimated),	78,000,000

Uraguay.

1897,	14,447,714
1900,	18,608,717
1901,	17,624,548

United States.

1890,	44,336,072
1900,	41,883,065
1905,	40,227,609

I do not need to draw a lesson from the above figures, although a number of conclusions are possible. One is surprised to learn for example, that Russia with almost fifty-two million sheep in Europe and over twenty million sheep in Asia, is almost as much of a producer of wool as Australia, always acknowledged as the premier wool country. Of merino wool alone, Russia grows about 100 million pounds and of carpet wool far more. And yet Russian merino does not appear in our markets or any other of the world's wool markets to compete with the product of the Cape or Port Philip or Ohio and of Russia's great quantities of carpet wools the exports are continuously declining, the annual average of 70,164,000 pounds in the period about 1881 having sunk to less than 24 million pounds in 1901. The tale would be worth telling how Russia has been regenerated under the great WITTE, how by careful arrangement of tariffs and bounties a great manufacturing Russia has been built up until far from being able or desiring to deluge the rest of the world with its wool Russia yields its supply even of carpet wool more and more grudgingly and is actually a purchaser of fine wools in other markets. Equally interesting stories could be told how in all countries as civilization progresses the pastoral life is abandoned. Cereals are grown where sheep used to graze. The ploughshare drives the herds before it — and they never return. It has been so in Russia, in the Argentine, in the Cape. It was so in Texas and the great cotton crop there is the result. It is so all over the country.

But these are not matters I set out to prove. My purpose was to show how absolutely impossible it was to reason by analogy from the present extraordinarily high price of wool, that cotton was clearly bound for a higher figure or was pretty sure to stay as if pegged in the vicinity of its present price. There can really be no relation between cotton and wool. They are grown under different conditions, they are subjected to different manufacturing processes, they are sold under different market influences. The only influence which acts upon them both is national prosperity or distress.

It is fair to figure, however, just as the cotton bull operator did whose advertisement suggested this study, that if a great demand exists for woolens an equally great demand is sure to exist for cotton fabrics. When people can afford to increase their purchases of woolens in large degree they can afford to and I am convinced do increase their purchases of cotton fabrics in even greater degree. So if you assume, as the operator in question did, that the great increase in the prices for wool was due to enormously increased demand from the purchasing public for woolen goods, it was altogether plausible to conclude that a great increased use of cotton fabrics was occurring, or was sure to occur, and that this was bound to create a demand for cotton that would carry its price to unusual heights. The flaw in his reasoning, a fatal flaw too, was that the greatly increased price of wool was not due to demand for goods. As a matter of fact, the figures we have already read show that the increase of price was far more directly due to a remarkable decrease in the world's flocks of sheep and therefore in its clips of wool.

The PRESIDENT. Are there any remarks on this subject? The Secretary has a notice to give.

The SECRETARY. If any of you who are interested in cotton textiles in the Chinese market, will come to the desk I may be in the way of giving you some information to your advantage.

The PRESIDENT. If there is no other business the session is adjourned until 10 o'clock tomorrow morning.

THIRD SESSION.

THURSDAY MORNING, APRIL 26, 1906.

The Association met in Huntington Hall at 10 A. M., President MACCOLL in the chair.

The PRESIDENT. I have pleasure in calling on Mr. GEORGE MOORES of London, England, to read a paper on Weights and Measures Applied to Textile Numbering. [Applause.]

WEIGHTS AND MEASURES APPLIED TO TEXTILE NUMBERING.

GEORGE MOORES, F. S. S., 25 Victoria Street, London, S. W., England.

When I received an invitation from your President, Mr. MACCOLL, to read a paper before this meeting, I had no hesitation in complying, for I deemed the invitation an honor and I felt it would be a privilege to speak to you on the question; moreover, it is of the greatest importance in dealing with this subject of the metric system, that the two great English-speaking communities, enjoying as we do, a common language, common literature, common customs, common institutions, common weights and measures and a common freedom, should act together, and in order to do so we must have an interchange of views whenever an opportunity presents itself, as it does on such an occasion as this.

Seeing that I have made a somewhat extensive study of the subject of weighing and measuring; that I am here as the secretary of an Association of users of British Weights and Measures; and that I have been directly and indirectly connected with textile interests for many years, I propose to divide the short time at my disposal by first drawing attention to the leading principles of the metric system, then explaining the policy and work of our Association in regard to that system, and concluding with a few observations as to what should be the policy of the industry you represent.

METRIC SYSTEM.

It has been well said by many writers during the last three centuries and by none better than by JOHN QUINCY ADAMS, an American secretary of state in the last century, that there is no undertaking so difficult of accomplishment as the reform of weights and measures. It is a reform which affects every man, woman and child in the state. In view of the far-reaching effects of any change in that direction, it is of the utmost importance that everyone should clearly understand any suggested proposals for bringing about a change. Let us therefore begin by defining what we understand by the term "metric system". A just definition of the principles of that system would be "A system of weights and measures based on a single measure of length". The only application of this principle at the present time is a system in which the base measure of length is fixed by the length of a piece of metal 39.37 inches long, and to which has been given the name of "Metre". Longer lengths than the metre are obtained by multiples of 10 of that length and shorter lengths by divisions of that length by 10. Measures of volume or capacity, are obtained by taking a cube whose side is a certain linear measure and making that cube the volume unit, again obtaining larger and smaller denominations by decimal multiples and sub-multiples. The unit of weight is taken as the weight of a fixed volume of water at a certain temperature, and this again is operated decimally to provide the major and minor measures of weight. The whole system of length, volume and weight, is thus based on "a single measure of length", in this case the metre, by a process in which the respective values are co-related.

We may now ask, is there anything in this system specially to recommend it, and if so, what? What grounds have the prometerists for asking our respective governments to compel everyone else to use it?

It will be seen from the description just given of the system, that there are two main principles observed—(a) co-relation, (b) decimalization. It is often claimed that the principle of co-relation was invented and first applied by certain mathema-

ticians in the eighteenth century, but that principle existed in British weights and measures 500 years earlier. By an act of Parliament, whose members were misled by a few clamorous individuals who had interests of their own to serve, that principle of co-relation was departed from in Britain, but there are various methods by which it could, if required, be re-introduced with slight trouble and with very little, if any, cost; whilst to re-introduce that principle with the metre as the base is a practical impossibility. The second principle, decimalization, was unknown prior to a comparatively recent period of the world's history. Its value lies solely in its harmonizing with our arithmetical notation.

Co-relation has undoubted advantages for some businesses, of which chemistry may be cited as a leading instance. Its value lies in the fact that each weight has a corresponding volume and vice versa, though this is only strictly true when the medium of co-relation is pure water at its greatest density. In all other cases, recourse has to be had to the tables of comparative densities to get the exact weight required. Owing, however, to its being very rarely necessary to obtain minute exactness in things weighed and measured, the field of usefulness of this co-relation is considerably widened by the readiness with which approximate values are obtained. The principle has no value whatever to textile spinners and manufacturers, as such.

Decimalization appeals to a very much wider field than co-relation, and probably 99 persons out of every 100 who profess to be in favor of the metric system, think of it only as a decimal system. With the conventional form of computation whereby whole numbers are separated from fractional parts by what is termed a decimal point, there is not much cause to grumble. It is a ready form of computation and regularly used in practically all businesses. Whilst this principle has much to recommend it, it must not be overlooked, that, as applied to the metric system, its users are tied to that form of computation, and their field of arithmetical knowledge and efficiency is thus limited. It is well-known by you, that as textile calculations

are now made, decimals are already used if, and when required, whilst we also have the advantage and the opportunity of using the binary and other scales when such suits our purpose better, as is often the case.

We see then that the metric system in its first principle (co-relation) has nothing to recommend it to textile manufacturers, whilst in its second principle (decimalization, and that form of computation only), it would actually tend to restrict our arithmetical operations.

Who use the system? Scientists, analysts, chemists, and teachers of the theory of science — scarcely anyone else. For them co-relation has a distinct value. Figures representing volumes of water also represent their corresponding volumetric weights, and this merit is further enhanced owing to water also being made the unit of specific gravities, thermal, etc., values. Decimalization too is to them a necessity. It enables them with comparative readiness to express the size of a molecule or the dimensions of a planet; to state the contents of a small phial or of a reservoir, in terms of their measuring unit.

Are scientists justified in agitating for Parliamentary powers to enforce a system which they find suited to their purpose or to manufacturers and others? We must recognize, and scientists also must recognize, that an ideal system of weights and measures must be a system suitable alike for science, manufacture and trade. The metric system does not comply with these requirements. Whilst it is suitable for pure science, it is not suitable either for manufacturing or for trade. Wherever the scientific man has introduced the metric system, he has thereby promoted confusion rather than conformity. Scientists both at home and abroad use the system because it is suited to their requirements and because they doubtless find it an advantage to be able to understand each others calculations. Their knowledge, and their speculations, are international and common sense demands that the vehicles they use for intercommunication should likewise be international. But in no country can the manufacturer use that system to better advantage than

his old system (in many cases it has proved much inferior) and in no country will the trader use it except when he is compelled to do so by law. The disability which the manufacturer and trader find in the system is not inherent to the principles of the system, but to the unit — the metre — on which the system is based. As based on that unit, the much lauded metric system has been under a disability from the beginning. Supposed to be a natural constant, it has proved to be nothing of the kind. It was invented by a few mathematicians whose eminence in that profession was only equalled by their personal vainglory to produce something new. They laid it down as a *sine qua non* that whatever length was adopted it must be unlike any other measure of length in the world. These gentlemen arrogated to themselves a position by which they, who knew nothing of manufacturing, were to dictate what measuring tools makers were to use, and being totally unconnected with trade was their qualification for advising those in it. The metre was objected to by WATT, the celebrated engineer, when it was first introduced in France in 1793; it was again opposed by WHITWORTH when it was reintroduced, after a lapse of many years, in 1840: the Engineering Standards Committee of England are today working on the inch in preference to the metre; the London University after making the millimetre scale compulsory for several years for the drawings executed by its examinees has reverted to the inch; the English government, just come into power, has instructed its consuls to use only British terms in describing weights and values in their reports; the American Society of Mechanical Engineers only last December accepted a report recommending all screw gauges to be based on the inch; such eminent firms as Sellers of Philadelphia and Brown, Sharpe & Co., of Providence, firms who have had much experience with both inch and metre measures declare for the former, whilst the English firm of Willans and Robinson, much quoted by prometerists both in America and England as a metric firm, have just decided after years of experiment and practice to adopt the inch in any new work they undertake. As regards the adapta-

bility of the metric units for general trade, its unit of weight is too large, as is also its unit of capacity, for convenient use. It has for instance almost entirely gone out of popular use in the wine trade of Europe.

The system has not been adopted in any country by choice of the people. It has always been enforced by bureaucratic governments who have over-ridden the people's will. It is legal in all English-speaking countries, but in those countries freedom reigns, their governments are of the people, by the people, for the people. Those people do not choose to adopt the metric system, and present day bureaucrats are usurping their powers and straining their privileges in seeking power to compel them. They have neither right, reason nor constitutional authority for their action.

Inasmuch, therefore, that no country in the world has adopted, nor is it feasible to adopt, the metre system for all purposes of manufacturing and trade, it is an imperfect system, and instead of manufacturers and traders being compelled to use it, there are much stronger reasons for compelling scientists to give it up.

BRITISH WEIGHTS AND MEASURES ASSOCIATION.

This Association was formed in July, 1904. It is governed by a committee of control, at present consisting of twenty-two members, leading manufacturers or representatives of trading associations, of whom two are American and two Canadian. Its objects are the defence, standardising and simplifying of British Weights and Measurers. These objects can only be brought about by a gradual and necessarily slow process. For the time being the work of the Association is confined to a policy of "Opposition to the metric system and of investigating and collecting data to be eventually considered by a convention of English-speaking peoples." We have already received fourteen schemes, all claiming to bring about a system of weights and measures superior to the metric system and to our present system. Of these schemes, one comes from Australia, one from New Zealand, one from India, two from France and eight from

Great Britain. We propose to go on collecting all the ideas we can get from all parts of the world, pertaining to weights and measures and then promote a convention of well qualified and trusted representatives of all English-speaking countries to consider the various schemes and report to their respective governments. Such a convention we hold should be composed mainly of practical men, together with a due proportion of scientists. This convention would doubtless see that steps were taken to get the schemes discussed by the various trades affected, so as to obtain all the advantages afforded by the special knowlege possessed by representatives of those trades. Take the textile trades for example. Before a scheme is put forward officially for that trade, the matter should be first discussed independently by the respective associations representing cotton, woollen, silk, linen, jute, etc.; then a joint committee should take up the subject in the interests of the textile industry in general. One or more representatives of this joint textile committee would have a seat on the main committee, whose members would discuss the question in its application to textiles, engineering, chemicals, dry goods, etc., etc. It is only by some such process that we can be certain of having all the knowledge possessed by members of various trades and professions brought to bear on the subject. By working on such lines we are more likely to get reform on sound, lasting principles and moreover we obtain the reform by what QUINCY ADAMS laid down as the only proper method of obtaining it, "by consent of the people and not by force."

TEXTILE INDUSTRY.

In a paper read at the International Congress of Cotton Spinners held in Manchester, England, last year, the author, Mr. BYROM, a Lancashire spinner, said, "I take it we all agree that a uniform system of numbering yarns is desirable from an international point of view." All who have studied the question in its various phases will agree with him. Of the advantages to be gained by the adoption of such a system there can be little doubt.

Now let us first see what is the present practice in numbering yarns, and then consider how best to bring about a universal system and so reap the advantages which we expect to follow its adoption. The number, or count, of yarn at present varies with the material. In cotton it is 840 yards to the pound; in worsted, 560 yards to the pound; in linen, 300 yards to the pound; and in silk, 1,000 yards to the dram. Whilst those bases may be taken as generally applicable to those four trades, there are variations in others. The cotton count, described by Mr. MATTHEW BLAIR of Glasgow, author of Comparative Yarn Tables as "the most simple of all the scales", is not only universal in English speaking countries, but is in international use. The linen count also is practically universal. In woollen counts there are half a dozen variations even in English speaking countries. In an excellent book just published* dealing with textile calculations, the author wisely points out how much easier it is to formulate a more uniform method of numbering than it is to establish one, for the difficulties of the problem increase with the study of the subject. The various systems, being the growth of ages, have woven around them many factors of established interests and customs. For example, reels and yarn testing apparatus are made to standard sizes and adapted to suit the different denominations. Again, manufacturers and employees have, after much deliberation, fixed prices to be paid for the production of specified counts combined with other factors, and any radical change from the present system of "counting" would involve a reconsideration by employers and their department managers, with the employees and their leaders throughout each respective country, with a considerable dislocation of trade. A change can only be brought about gradually by a process of evolution.

I refrain from troubling you with any proposals which have been made to base the counts on the metric system as that system is founded on a measure fundamentally impossible for

*"Calculations in Yarns and Fabrics" by FRED BRADBURY, Chief of Textile Dept., Municipal Technical Inst., Belfast, Ireland.

textile manufacturers. A body styling itself the "Permanent International Committee for unifying the numbering of yarns" has during the last thirty years promoted five conferences in Europe. At each successive conference the work of its predecessor has been undone and still another new proposal recommended. In the meantime, no one, save pro-meterists, has taken the slightest notice of their recommendations, and there are signs that its members saw at the last congress, that of 1900, the futility of their action, for it is on record that, in their opinion, "the entire reform will practically depend upon the fact, whether the opposition of England to the introduction of the metric-decimal system of numbering yarns can be overcome."

Whilst it may be inferred from this expression of opinion that a reform will practically depend upon England (I assume this to include America as an English speaking country) it pays us a compliment, but, at the same time, puts upon us a responsibility. If we are agreed, as I believe we are, that uniformity of numbering yarns is desirable, it puts the onus upon us to lead the way. As to by whom this should be done, how it should be done, and when it should be done, there will be no difference of opinion amongst us. It is certain that textile spinners and manufacturers are the best judges of suitable units for their trade. They will strongly resent, and rightly so, any bureaucratic dictation as to what they must use and what they must not use, as impudent and unwarranted interference: they will assert their freedom by proving themselves worthy of it in becoming the authors of their own salvation, and they will show their wisdom by the expedition with which they apply themselves to their task.

The PRESIDENT. Gentlemen, this is an important subject at the present time; are there any remarks or questions?

Mr. ARNOLD B. SANFORD. Mr. President, in view of the very able paper which has been read by Mr. MOORES of Eng-

land and the trouble which he has taken to come here to deliver such a fine address, I think we should express by a rising vote our special thanks to him.

The motion was seconded by Mr. M. F. FOSTER and carried unanimously by a rising vote.

The PRESIDENT. The next paper is on a very interesting and up-to-date subject, Reinforced Concrete Applied to Factory Construction. I have pleasure in calling upon Mr. ROBERT A. CUMMINGS, of Pittsburg, to deliver an address on this topic.

REINFORCED CONCRETE APPLIED TO FACTORY CONSTRUCTION.

ROBERT A. CUMMINGS, Member Am. Soc. C. E., Pittsburg, Pa.

The rather startling development of reinforced concrete as a building material has suggested presenting the subject in general review rather than along strictly technical lines. Most of the statements herein made have been taken from reliable authorities for your consideration in case you are contemplating its use.

Reinforced concrete is sometimes spoken of as armored concrete, ferro-concrete or steel concrete. It is a structural material, in which metal is embedded in concrete, to resist tensile stresses. The distribution of the metal depends upon a correct analysis of the stresses in the member due to its own and applied loads, and upon which opinions differ. However, a comprehensive investigation is now being conducted by the United States to determine certain constants and general conditions governing conservative designs. At present there are several methods employed which can be identified by the use of some peculiar shape of the steel reinforcement, or a peculiar distribution of the ordinary shapes and sizes of steel found in the open market.

The use of reinforced concrete is of comparatively recent date and its history is coincident with that of Portland cement. There was an exhibit at the Paris Exposition of 1855 and the French engineer, M. COIGNET, proposed certain applications in 1861. But M. MONIER, in 1867, appears to be the first to

employ reinforced concrete on a practical scale, and at the Antwerp Exposition of 1879, MONIER had an exhibit which led to further experiments in other European countries. Following this period, COTTANCIN and HENEBIQUE in Europe, and HYATT in the United States, were the first to use reinforced concrete for beams and other structural purposes. The experiments of KIRKALDY of London on HYATT'S reinforcement in an effort to analyze the value of his variable distribution of metal constitutes an interesting phase in the light of the present state of the art.

Possibly these experiments led RANSOME on the Pacific coast and GOODRIDGE in the East to further efforts and applications, the records of which are too recent to need repetition. However, the general employment of reinforced concrete has been regulated by the Portland cement industry, which during the 80's was a struggling infant in the United States, when we imported nearly all our Portland cement. Now we are exporting, having produced last year over 1,000,000 barrels more than consumed. The home production growing from about 100,000 barrels in 1880 to 36,000,000 barrels last year. Coincident with this remarkable development of the Portland cement industry has come the general employment of reinforced concrete, and American engineers have been quick to grasp the opportunity of its numerous advantages. While it is true that for a few years doubts of its reliability were expressed by the more conservative engineers, it is now known that these doubts were mostly unfounded. So that in reinforced concrete, we find a structural material meeting our requirements for inexpensive construction and equal in strength and permanency to the customary steel and masonry work.

The building codes of most of the large cities recognize its merits and publish certain regulations for its proper use, but in most of these codes full advantage is not permitted to be taken of its structural value. It can hardly be expected that the public will be allowed to indiscriminately use a comparatively new material.

In the appendix of this paper will be found safe engineering

data for guidance in the design of structural members of reinforced concrete, but it should be observed that the execution of the work must be entrusted to experienced constructors and specialists.

ANALYTICAL.

Among the desirable requisites of a structural material for mill buildings may be said to be the following, all of which are possessed by reinforced concrete.

1. Fire resisting qualities.
2. Durability.
3. Strength.
4. Resistance to vibrations.
5. Atmospheric influences.
6. Erection.
7. Economy.

1. *Fire Resisting Qualities:* Reinforced concrete is not combustible. No sparks or lighted brands of burning timber can be carried to adjoining property, and there is no distortion of the structural members in a fire as with unprotected steel.

Portland cement, which is the bonding material of the aggregates in concrete, is a very low conductor of heat and possesses great resistance to high temperature. It imparts this quality to the concrete of which it forms a part. Even when exposed to an interior fire for several hours, Portland cement concrete will continue to perform its duty satisfactorily. When the water in chemical combination is driven off by heat, the concrete is yet a poorer conductor than ever, so that the rate of heat penetration is much reduced.

The embedded metal will tend to prevent the cracking of the concrete due to excessive heat, but, if a crack appears, the structure will not have lost its strength so long as the metal remains. This low conductivity is also useful in case of a localized fire, as it permits the adjoining rooms and floors of a building to be occupied at once, and repairs are not needed beyond some plastering to projecting corners.

The co-efficient of heat expansion of steel and concrete is the same, which fact is of great structural importance, as no internal stresses are thus set up from the use of different materials.

The Bureau of Buildings for borough of Manhattan, New York, require exceedingly severe fire, water and load tests on all reinforced concrete designs, before permitting their adoption in that city. Numerous tests have been made there, all of which have proven the great fire resisting quality of concrete.

2. *Durability:* It is well known that Portland cement concrete continues to increase in strength for years after it is made so that it becomes at once a permanent building material and the cost of maintenance is practically nothing.

The embedded metal is protected against rust when covered by cement. Speaking chemically, Portland cement is alkaline and it will therefore, neutralize the attack of acids and act as a permanent medium for the preservation of the metal reinforcement. When the concrete is porous this may be accomplished by coating the metal with cement before placing in the work, but concrete, when carefully made, is impermeable.

Portland cement has a chemical affinity for iron, so that a chemical action takes place, forming a silicate of iron on the embedded reinforcement. This silicate is a protection against oxidization and removes any slight rust that may be present. This chemical action also takes its part, to a certain extent, in the physical bond and adhesion between cement and metal, but is not relied upon. It is an interesting fact that metal slightly rusted becomes better protected against oxidization than perfectly clean metal when subjected to the same treatment.

That concrete can be made impermeable to water, has been repeatedly shown, but great care is necessary to secure the greatest density possible. The writer has constructed 50,000 gallon concrete tanks for perfectly clear water, which have stood long time tests and no sign of dampness or sweating has appeared on the outside. This suggests its adaptibility for industrial water and reservoir tanks.

The monolithic nature of reinforced concrete structures is

particularly attractive from a hygienic standpoint. No opportunity is offered for the lodgment or propagation of disease germs or any animal life that are prejudicial to human interests. Where steam or hot water is used in dyeing and finishing rooms the woodwork decays very rapidly. This is avoided in reinforced concrete structures.

3. *Strength:* Reinforced concrete is a manufactured material. Its strength will depend upon the modifications in the details of manufacture. It can be designed to carry any load within ordinary practice. The writer has constructed concrete floors carrying a live load of 4,000 pounds per square foot.

From its nature it is apparent that the greatest strength of concrete is in resisting compressive stresses. In tension the strength is so uncertain that it must be neglected. Herein is the value of metal reinforcement for taking the tensile stresses due to bending. Although the metal is sometimes considered as acting in compression the method is uncertain, and questionable. If the reinforcement is skillfully arranged the necessity for such consideration may be avoided. In the writer's practice whenever there is need for additional strength in the concrete in compression as in columns, it is obtained by embedding the metal in the form of individual hoops or bands, thus surrounding the concrete much in the same manner as the hoops inclose an ordinary water tank.

There are so many details and strictly technical elements entering into the strength of reinforced concrete that a paper could be devoted to this part of the subject. But, it may be briefly stated, that when concrete is made under careful supervision by responsible constructors the results are uniform manufacture and strength.

The strength can be varied by any one of the following conditions:

1. The proportion and quality of the mixture.
2. The method and amount of mixing.
3. The degree of ramming.
4. The percentage of water used.

5. The atmospheric conditions while setting.
6. Age.
7. The manner of loading.

4. *Resistance to Vibrations:* Closely connected with the strength of reinforced concrete is its resistance to vibrations which is of peculiar value in textile factory construction. The greatest amplitude in the vibrations of a reinforced concrete floor is surprisingly small and the duration of movement brief. A number of experiments have been scientifically carried out on a competitive basis, which have demonstrated the truth of this statement. It has been confirmed in the discussion of a paper on reinforced concrete at the last convention of the American Society of Mechanical Engineers in New York of which the following is an extract:

"Our printing office is a room having nearly 21,000 feet of floor space and built with a carrying capacity of 350 pounds to the square foot. We are running in it 25 presses, most of them weighing about 13 tons and have ample space for additional machinery as it is required. There is practically no preceptible vibration when standing by the press, and no preceptible vibration whatever in the columns or on walls. The building is in this respect superior to our expectations, and we have no hesitancy in saying that a building properly constructed of concrete is an ideal one for machinery in motion.

The monolithic character of reinforced concrete structures in which flexible joints and connections are eliminated will largely account for its rigidity. It follows then that for the operation of high speed textile machinery this construction is ideal.

5. *Atmospheric Influences:* The influence of the weather upon concrete structures is not known to be detrimental. In course of time the solvent action of the rain, which is distilled water, would probably exercise a certain amount of influence on the cement. It is, therefore, suggested that all concrete roofs be covered with a protective medium, such as an asphaltic felt and gravel. Vertical outside members are not affected. Ordinarily speaking, concrete in buildings is not exposed to

sudden changes of temperature. But, provision must be made for changes of volume due to temperature and the humidity of the atmosphere.

When concrete sets in the dry atmosphere it will shrink about as much as it will expand when setting in water. The concrete for buildings should, therefore, be continually moistened for two weeks to protect it from too rapid drying by the sun or wind. These changes in volume are not serious in properly designed reinforced concrete, as the embedded metal will take care of the internal stresses due to the above causes.

The influence of frost is in retarding the setting of the cement, so that if it is desired to undertake reinforced concrete construction in winter, ample provision is necessary to protect the concrete while setting. After the concrete has set the effect of frost may be neglected. The writer has carried out extensive works in winter by making suitable provision against frost. Cool, but not frosty weather, is preferred to the hot drying atmosphere of summer. We have observed that concrete is a very poor conductor of heat by which the interior of buildings become equable in temperature, very much as a stone residence is cooler in summer and warmer in winter than a wooden one. This slight variation in temperature is due to the small radiation in a concrete structure.

6. *Erection :* The facility with which the structural parts of concrete buildings can be assembled in place and the speed of erection is of the greatest advantage. The larger part of the materials of construction and labor can be obtained locally. But, it will be necessary to secure the experienced services of a specialist for the design and execution of the work. All the materials should be tested and a careful selection made. This applies to steel cement, sand and other aggregates. The water used for mixing must be clean. The concrete must be properly mixed and carefully deposited. Wooden moulds which form the largest single item of cost should be as carefully laid out as the details of mill work. It is important that they should be put up with the view of easy removal for re-erection. The writer has

given special study to the practical parts of construction in dealing with the moulds and the distribution of the embedded metal. The essence of success in constructive work must be based upon the separation of mental and physical duties of the men. Separate operations should be prearranged and follow in regular sequence so that the working forces in the field shall be restricted to their physical duties. Every duty should be as simple as possible. Following the practice of structural steel work the steel reinforcements should be delivered at the site ready for placing in position in the moulds.

7. *Economy:* The cost of reinforced concrete will depend as much upon the efficiency and experience of the constructor, as upon any other item. Other things being equal skill in execution is the governing element in cost. As with other structural materials the locality will determine the unit prices of steel, cement and aggregates as well as labor. In the northern states it may be safely estimated that a reinforced concrete textile factory can be constructed with profit at from 75 cents to 85 cents per square foot. This is as cheap as the ordinary combustible wooden floor mill construction. By adopting "curtain walls" design considerable floor space is gained over brick buildings. Gantrys can be carried from the overhead floor beams. Reinforced concrete columns are no larger than a wooden column of equal strength.

The statistics of 1905 show that the total value of buildings constructed aggregate $600,000,000 and that for the same period the fire losses were $175,000,000, or almost one-third the value of new construction. This argument for fireproof construction is most potent.

CALCULATIONS ARE DERIVED FROM THE FOLLOWING HYPOTHESES.

1. Sections remain true planes during bending.
2. Modulus of elasticity of the concrete remains a constant between the working limits.
3. Entire tension taken up by the steel.
4. No initial stresses in either the concrete or stee.
5. Bond between steel and concrete is perfect, and both metal and surrounding concrete are equally deformed.

SYMBOLS USED IN FORMULAE.

FORCES.

- W – Total load on span "l" in pounds.
- D – Dead load per lineal foot in pounds
- L – Live . . . . . .
- M – Bending moment in inch pounds.
- P – Axial forces on columns or arches in pounds.
- R – Vertical shearing force at end of beam, uniformly loaded and simply supported at the ends, in pounds.

STRESSES.

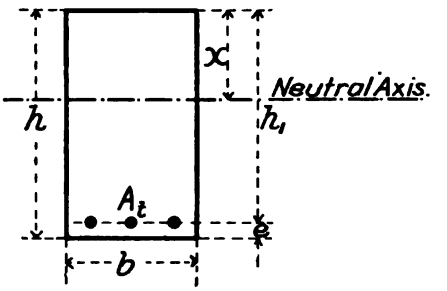
- C_o – Compression stress on hooped concrete in pounds per square inch.
- C_c – Compression stress in concrete in pounds per square inch.
- C_t – Tensile stress (or least compression stress in arches and columns) in concrete in pounds per square inch.
- S_c – Compression stress in steel in . . . . .
- S_t – Tensile stress (or least compression stress in arches and columns) in steel in pounds per square inch.
- V – Permissible shearing stress in concrete in pounds per square inch.
- V_c – Shearing stress in concrete in pounds per square inch.
- V_v – Shearing stress in vertical or inclined shear bars in pounds per square inch.
- H – Internal lateral pressure in hooped columns in pounds per square inch.
- I – Moment of inertia of section in inchs.
- E_s – Modulus of elasticity of steel in pounds per square inch.
- E_c – Modulus of elasticity of concrete in compression in pounds per square inch.
- N – $\frac{E_s}{E_c}$
- K – Coefficient varying from 1 to 1.5 (see hooped columns)

A_x - Total cross sectional area of hoop steel per lineal inch of height of column.
A_y Required cross sectional area of each hoop.
A_c - Area of concrete in compression in columns in square inches.
A_t - Area of steel in tension (or smallest compression in arches) in square inches.
A_s - Area of steel in compression in square inches.
A_r - Area of vertical or inclined shear bars from centre of beam to end of beam in square inches

DIMENSIONS

l - Span between centres of supports in inches
h - Total depth of section in inches
h_1 - Effective depth of section in inches equal to distance from centre of gravity of steel in tension to surface of concrete in compression.
h_2 - Total depth of T section under slab in inches.
h_3 - Thickness of horizontal flange of T section in inches.
e - Distance from centre of gravity of steel in tension to surface of concrete in tension in inches
e_1 - Distance from centre of gravity of steel in compression to surface of concrete in compression in inches.
b - Width of rectangular section in inches.
b_1 - Width of horizontal flange of T section in inches.
x - Distance from surface of concrete in largest compression to neutral axis in inches
y - Distance from neutral axis to centre of compression stresses in inches.
v - Distance from centre of gravity of section to surface of concrete in largest compression in inches (see arches)
d_1 - Distance from centre of section to steel in compression in inches
d - Distance from centre of section to steel in tension in inches.
g_1 - Distance from centre of gravity of section to steel in largest compression in inches
g - Distance from centre of gravity of section to steel in smallest compression in inches.
f - Inside diameter of hoop.
s - Vertical distance centre to centre of hoops.

MEMBERS SUBJECT TO FLEXURE ONLY.



RECTANGULAR SECTION.—Steel only in tension.

SINGLE REINFORCEMENT.

To design a beam:

$$x = \frac{N h_1 C_c}{S_t + N C_c}$$

$$h_1 = \frac{S_t + N C_c}{C_c} \sqrt{\frac{6M}{N b (3S_t + 2NC_c)}}$$

$$A_t = \frac{N b h_1 C_c^2}{2 S_t (S_t + N C_c)}$$

$$V_c = \frac{R}{b(h_1 - \frac{x}{3})} \quad \text{and if } V_c \text{ exceeds } V.$$

$$A_t = \frac{b i (V_c - V)^2}{4 V_c V_v}$$

To review a beam:

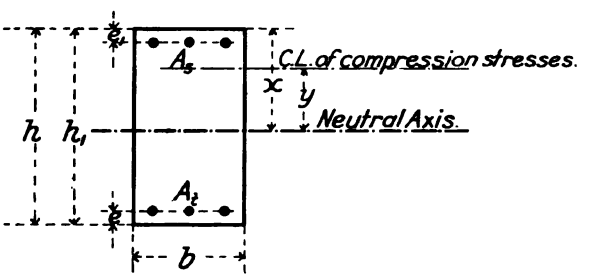
$$x = \frac{N A_t}{b}\left(-1 + \sqrt{1 + \frac{2bh_1}{NA_t}}\right)$$

$$C_c = \frac{2M}{bx(h_1 - \frac{x}{3})}$$

$$S_t = \frac{M}{A_t(h_1 - \frac{x}{3})}$$

$$V_c = \frac{R}{b(h_1 - \frac{x}{3})} \quad \text{and if } V_c \text{ exceeds } V.$$

$$V_v = \frac{b i (V_c - V)^2}{4 A_r V_c}$$



DOUBLE REINFORCEMENT.—Steel in tension and compression.
Assume h_1, A_1 and A_2.
x is found by solving this equation.

$$x^2 = 2xN\frac{A_1+A_2}{b} - \frac{2N}{b}(h_1A_1 + e_1A_2) = 0$$

$$C_c = \frac{2Mx}{bx^2(h_1-\frac{x}{3}) + 2A_2N(x-e_1)(h_1-e_1)}$$

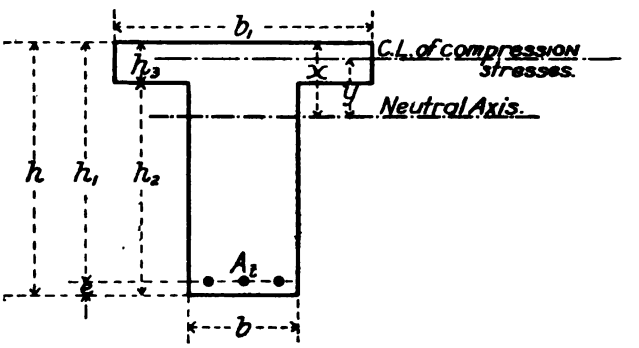
$$S_1 = NC_c\frac{h_1-x}{x}$$

$$S_2 = NC_c\frac{x-e_1}{x}$$

$$y = \frac{\frac{1}{2}bx^2 + NA_2(x-e_1)^2}{\frac{1}{2}bx^2 + NA_2(x-e_1)}$$

$$V_c = \frac{R}{b(h_1-x+y)} \quad \text{and if } V_c \text{ exceeds } V.$$

$$A_F = \frac{bl(V_c-V)^2}{4V_cV_v}$$



T SECTIONS.~ Assume h, A_t and b_1 ($b_1 < \frac{1}{4}l$)

$$x = \frac{2NA_t h_1 + b_1 h_3^2}{2(NA_t + b_1 h_3)}$$

$$y = x - \frac{h_3}{2} + \frac{h_3^2}{6(2x - h_3^2)}$$

$$S_t = \frac{M}{A_t(h_1 - x + y)}$$

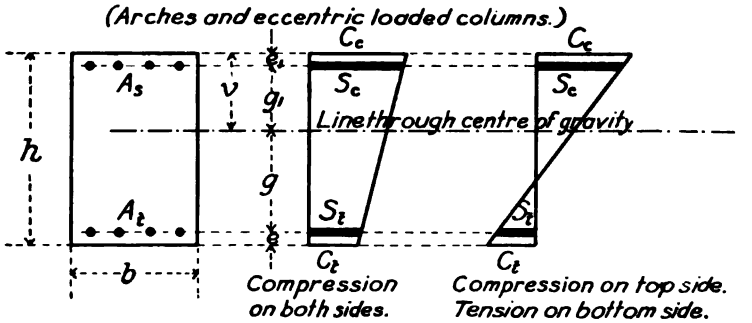
$$C_c = \frac{S_t x}{N(h_1 - x)}$$

$$V_c = \frac{R}{b(h_1 - x + y)}$$

$$A_r = \frac{bl(V_c - V)^2}{4V_c V_v}$$

MEMBERS SUBJECT TO FLEXURE AND COMPRESSION.

(Arches and eccentric loaded columns.)



$$v = \frac{\frac{1}{2} b h^2 + N[A_t (h-e) + A_s e_1]}{bh + N(A_t + A_s)}$$

$$I = \tfrac{1}{3} b v^3 + \tfrac{1}{3} b (h-v)^3 + N A_t g^2 + N A_s g_1^2$$

$$C_c = \frac{P}{bh + N(A_t + A_s)} + \frac{Mv}{I}$$

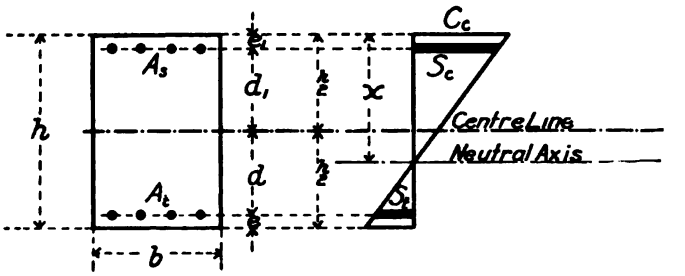
$$C_t = \frac{P}{bh + N(A_t + A_s)} - \frac{M(h-v)}{I}$$

For symetrical section, that is $A_s = A_t$ and $e = e_1$, $v = \frac{h}{2}$

$$I = \tfrac{1}{12} b h^3 + 2 N A_s g^2$$

When C_t becomes negative it means that tensile stresses will appear in one side of the section.

If these stresses are very small, not exceeding the tensile strength of concrete, it is not necessary to carry the investigation further, but if they are of larger value, the section should be refigured, neglecting the tensile strength of concrete as shown in the following.



$P = \frac{1}{2} b C_c x + A_s S_c - A_t S_t$

$M = \frac{1}{2} b C_c x (\frac{h}{2} - \frac{x}{3}) + A_s S_c d_1 + A_t S_t d$

$S_t = N C_c \frac{d + \frac{h}{2} - x}{x}$

$S_c = N C_c \frac{d_1 \frac{h}{2} + x}{x}$

By these four equations x, C_c, S_c and S_t may be found, when h, b, A_s, A_t, d and d_1 are assumed.

For symmetrical reinforcement, that is $A_s = A_t$ and $d = d_1$

$P = \frac{1}{2} b C_c x + A_s (S_c - S_t)$

$M = \frac{1}{2} b C_c x (\frac{h}{2} - \frac{x}{3}) + A_s d (S_c + S_t)$

$S_t = N C_c \frac{d + \frac{h}{2} - x}{x}$

$S_c = N C_c \frac{d_1 \frac{h}{2} + x}{x}$

In this case it is easier to assume values of h, b, d and C_c and find S_c, S_t, x and A_s by the four equations.

MEMBERS SUBJECT TO COMPRESSION ONLY.
HOOPED CONCRETE COLUMNS.

$C_a = C_c K + 4.8H$ (Considère's Formula.) The value of K is 1.0 when H = 0 pounds per sq. inch or over. " " " 1.5 " " = 70

Assume:

$C_c = 500$ pounds per square inch.

$H = 70$ " " " "

$K = 1.5$

Hence:

$C_a = 500 \times 1.5 + 4.8 \times 70 = 1086$ pounds per square inch

When the inside diameter of hoop is "f" and the total area of hoop steel per lineal inch of height is A_x we have $A_x = \frac{Hf}{S_t}$

For hoop steel with a cross sectional area of A_y and spaced "s" inches centre to centre we have.

$A_x = \frac{2A_y}{s}$ and $A_y = \frac{A_x s}{2} = \frac{Hfs}{2S_t}$

When $H = 70$ pounds per square inch and $S_t = 16000$ pounds per square inch

$A_y = \frac{70fs}{32000} = \frac{fs}{457}$

For example:

$f = 23$ inches and $s = 3$ inches.

$A_y = \frac{23 \times 3}{457} = .151$ square inch = cross sectional area of band required, say $1\frac{1}{2}$ inches × #12 B.W.G.

The safe load for this column will be $\frac{\pi 23^2}{4} 1086 = 451{,}000$ pounds.

The PRESIDENT. Are there any remarks or questions on the subject of this paper?

Mr. CHARLES H. FISH. Mr. President, I would like to ask Mr. CUMMINGS just one question in reference to tank work. In figuring the thickness of the walls, in tank construction of reinforced concrete, do you have to take into consideration the question of leakage, the soaking through of the water or of the liquid?

Mr. ROBERT A. CUMMINGS. If the water flows through the tank there can be no pressure. Flowing water exerts no pressure.

Mr. CHARLES H. FISH. I beg your pardon, Mr. CUMMINGS, you did not understand. I meant in tank work where you are holding a tank of water or liquid, in figuring the thickness of the walls of the tank — the sides of the tank — in figuring for strength do you have to take into consideration the thickness necessary to avoid the soaking through of the liquid?

Mr. ROBERT A. CUMMINGS. No. The thickness of the concrete is largely a matter of judgment and is left to the constructor. Some constructors are disposed to make very thin tanks. My practice is otherwise. The amount of steel required for reinforcing the tank is easily determined. Figure the static head of the water, and if it is a circular tank, multiply the pressure by the radius of the tank, to get the tension in the steel per unit of height. If it is a rectangular tank, the stresses will be determined by figuring the sides independently.

Mr. CHARLES H. FISH. Excuse me, Mr. CUMMINGS; the point I was trying to make was whether you have any difficulty in reinforced concrete tanks with the soaking of the water or the liquid through the walls of the tank, in the strictly reinforced concrete tanks?

Mr. ROBERT A. CUMMINGS. There should be no difficulty.

The subject of tanks is one that is extremely interesting because it brings out the point that I have tried to emphasize and that is, the necessity of making as dense a concrete as possible. On this point I will relate an experience. One of the fifty thousand gallon tanks referred to in my paper was built of concrete mixed in the proportion of one, three and six. Ordinarily speaking, this is the class of concrete used in foundations, but it was made water-tight by a proper balancing of the aggregates consisting of cement, sand and small stone, in which the voids were filled. The void determination being made in my laboratories. The construction of tanks is generally a business proposition with most constructors who get through as quickly as possible. Therefore it is somewhat risky to construct concrete water tanks unless you know that your constructor is a man who thoroughly understands the details and technicalities of his business. Most people think of making concrete as mixing mud puddles, so much water, sand and gravel and cement, mixed together and you have concrete. That is not the case at all. Reinforced concrete is not that kind of material. It is a material requiring as much care in its manipulation as any other manufactured material.

The porosity of concrete is an element upon which further information is yet to be obtained, but that concrete water tanks can be made perfectly water-tight I have proved in the tanks referred to. These tanks had sixteen feet of perfectly clear water and were 28 feet in diameter. The tank remained under test two weeks and there was not a damp spot on the outside.

Mr. CHARLES H. FISH. May I ask the thickness of the walls?

Mr. ROBERT A. CUMMINGS. Nine inches.

Mr. HENRY P. GREG. Mr. President, I understand that Mr. CUMMINGS recommends this reinforced concrete for textile mills. I should like to know very much what he considers the effect of oil on this reinforced concrete, because it is perfectly impossible in a textile mill to keep oil off the floors.

Mr. ROBERT A. CUMMINGS. The only case that I have had with oil, has been in the engine room, where concrete floors are invariably used, and I have yet to find the first place where the oil has affected the concrete in any manner. The subjoined letter explains itself as to the effect of oil on concrete floors.

CHICAGO, ILLINOIS.

Mr. R. A. CUMMINGS,
4 SMITHFIELD STREET,
PITTSBURG, PA.

Dear Sir: Referring to our conversation as to the effect of grease and oil on concrete work: during the past seven years, I have made this point a special study in connection with Packing House work. I find that grease and oil by themselves have no effect upon concrete floors, if they are properly laid, even when there is wear and tear from trucking but in places where the grease is very hot and where the floors are washed down with hot water and acids, like soda ash, we find that the concrete floors deteriorate very rapidly even when there is no trucking.

Hoping this will give you the desired information, I am,

Yours truly,

SCHWARTZSCHILD & SULZBERGER CO.,
per L. LEVY, *Chief Engineer.*

Mr. LOUIS SIMPSON. Mr. President, the matter of reinforced concrete is one that I have spent a good deal of time in considering, and I think I would be able to answer one of the questions. As to the tanks, I can assure Mr. FISH that in India the Indian Government has been making concrete tanks for many years, and that they are made of walls which did not exceed six inches in thickness, and that they have no trouble there from leakage. As to the trouble with the oil, I have known oil put on the concrete floors of power houses for the purpose of keeping down the dust, and there was no harm done to the concrete from that oil, but I should imagine that anybody building a mill in this country could arrange it so that the floor

would be covered by hard wood placed over the concrete. I may say that I am confident in my own mind that a reinforced concrete mill can today be constructed in many parts of the northern states and in many parts of Canada at a cost less than the present style of mill, and I hope to have at some time in the near future the opportunity of building such a mill. So far as my investigations have shown me, I am certain that I can build such a mill, and build it to cost less money, than I can by using the present standard factory construction. There are difficulties which have to be overcome in detail, but I see no reason why those difficulties should not be overcome and I am quite certain that the mill of the future will be a reinforced concrete mill. But it has not to be built by a fool; it will have to be built under skilled engineers, and every detail of the construction will have to be properly supervised.

Mr. ERNEST L. HERSOM. I would like to ask the speaker his opinion of the hollow block concrete work.. I have seen as I traveled over the country a great many new industries in which their manufacture was hollow blocks and I have seen a good many buildings in process of construction. I would like to ask Mr. CUMMINGS what his opinion of that method is as compared to the reinforced concrete.

Mr. ROBERT A. CUMMINGS. The hollow concrete block industry, is one allied with Portland cement. It has no other relation to reinforced concrete. Hollow concrete blocks are a substitute for brick; on partitions or walls, I believe in many cases they can be substituted for brick, depending upon the price of brick.

Mr. LOUIS SIMPSON. Mr. President, in the matter of the hollow blocks I am sorry I do not agree with Mr. CUMMINGS. I would use the hollow blocks for walls, carrying the weight of the building on reinforced concrete. I would use the hollow blocks for the purpose of keeping out the weather and the cold.

Mr. WILLIAM W. CROSBY. Mr. President, I should like to inquire of the speaker in regard to the action of reinforced concrete under transverse loads, particularly with reference to the length of span that may be obtained, due consideration being given to economy and practical construction.

Mr. ROBERT A. CUMMINGS. It is a very difficult thing to answer a general question in detail.

Mr. WILLIAM W. CROSBY. I appreciate it.

Mr. ROBERT A. CUMMINGS. If you will provide me with given conditions, I can probably answer more satisfactorily. But roughly speaking, a reinforced concrete girder can be constructed economically up to 30 or 40 feet span. It may be interesting to some members to know that in Pittsburg a couple of years ago I constructed a machine shop entirely of reinforced concrete. The shop was 102 feet wide by 160 feet long, and was composed of a main nave and side aisle on either side. One aisle was a span, of 30 feet, and the other was about 20 feet. The nave, therefore, would be in the neighborhood of 50 feet. This nave was covered with a concrete ribbed arch roof, (practically a concrete arched truss,) carrying a concrete slab for the roof on concrete columns, 20 feet centre to centre. About 40 feet from the ground and supported on circular columns was a girder carrying a traveling crane of a capacity of 30 tons, the load moving at the rate of 350 feet a minute. That structure has been in operation for two years, and so far as I know there is no sign or evidence of failure.

Mr. WILLIAM D. HARTSHORNE. I would like to inquire if the speaker knows anything about the buildings in San Francisco, whether any of those which have withstood the effects of earthquake were of reinforced concrete.

Mr. ROBERT A. CUMMINGS. I know nothing beyond what has appeared in the daily press. The report in the Pittsburg

papers was that the Almeda Building, which is a reinforced concrete factory building of the Pacific Coast Borax Company, withstood the earthquake and the fire. I have no further information.

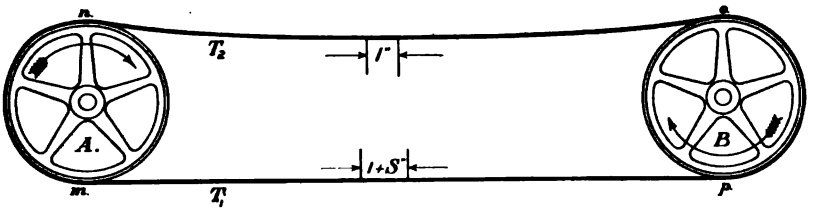
The PRESIDENT. Are there any further questions? If not, I shall proceed with the next paper on the program, Belt Creep, by Mr. W. W. BIRD of Worcester, Mass.

BELT CREEP.

W. W. BIRD, Worcester, Mass.

The relative speeds of two belt connected pulleys, is an every day problem in power transmission. The solution of the problem is very simple if "somewhere near right" is good enough. If a 4 foot pulley making 100 revolutions per minute drives a 1 foot pulley, then the smaller pulley will make 400 revolutions per minute according to the rule that the ratio of the speeds is inversely as the ratio of the diameters. To be more accurate, it is necessary to consider the thickness of the belt and the crown of the pulleys, assuming that the correction for this increases the diameter of each pulley ⅜ of an inch, then the smaller one would make 390.9 revolutions per minute, a difference of more than two per cent. This correction is generally made by taking the diameter of the pulley on the crown, for the pitch diameter, with no allowance for the thickness of the belt. The correction, however, to be more accurate, should be made by taking for the pitch radius of the pulley, the distance from the centre to the middle of the belt at the mean diameter of the pulley. That is, average the diameter of the pulley at the crown with the diameter at the edge of the belt and add the thickness of the belt; this gives the pitch diameter. And the speeds of any two connected pulleys are inversely proportional to the pitch diameters.

There is, however, another factor to be considered if it is necessary to know just how fast the 1 foot pulley is to run, and this brings us to the subject of the paper, Belt Creep.



In the diagram let *A* be the driver and *B* the driven pulley. Let *T1* be the belt tension on the tight side and *T2* the tension on the slack side. Let the belt and the pulleys be running in the direction indicated. Then one inch of belt from the slack side goes on to the pulley *B* at *o*. As it nears the point *p*, it begins to feel the effect of the increased tension and as it leaves the pulley, stretches to 1 + *S* inches. It now travels from *p* to *m* and goes upon pulley *A* in this stretched condition. As it nears the point *n* the tension decreases and the section contracts to the original inch as it leaves the pulley *A* and completes its cycle. The difference in the tensions *T1* - *T2* is the effective tension *T* and this varies with the load. When the load is light, the belt stretches near the point *p*. If the load is heavy, the stretching extends over a greater arc and if it reaches *o*, the belt slips on the pulley, this may also take place if the belt is loose even with a light load.

As the belt stretches on the pulley *B*, it creeps ahead, the amount varying with the load and the elasticity of the belt. It can be readily seen that the pulley *A* must be running faster than *B* to take up this stretch. On the pulley *A* the belt creeps back relative to the pulley at *n*, so that the belt does not come off as fast as it goes on.

Notation.

Let x = per cent. of slip,
V_1 = pitch velocity of driver,
V_2 = pitch velocity of driven,
t = effective tension per square inch,
E = modulus of elasticity of belt,
S = stretch in one inch due to t.

$$x = \frac{V_1 - V_2}{V_1} \quad \frac{V_1}{V_2} = \frac{1+S}{1} \quad \frac{E}{t} = \frac{1}{S}$$

$$x = \frac{S}{1+S} = \frac{t}{E+t}$$

The following table gives the per cent. of creep for various tensions and values of the modulus of elasticity.

Per Cent. Creep.

Effective Tension per square inch.	Modulus of Elasticity 10,000	15,000	20,000
25	.25	.17	.12
100	.99	.66	.50
125	1.23	.83	.62
150	1.48	.99	.74
175	1.72	1.15	.87
200	1.96	1.32	.99

The modulus of elasticity varies with the belt speed, having a minimum value of about 12,000 pounds per square inch when the belt is not moving and a value of about 20,000 when running at a belt speed of about 2,000 feet per minute.

By the table it will be seen that under ordinary conditions the loss due to creep will not exceed one per cent. and would only amount to about two per cent. with a fairly elastic belt and at slow speed. Allowing one per cent. for belt creep, the speed of the 1 foot pulley will be 387 revolutions per minute.

It must be remembered that the loss will vary with the load but will always amount to something as long as the belt is elastic and some load is being transmitted and the loss of power can not be avoided by belt-tighteners or patent pulley coverings.

Another interesting fact with regard to belts has been shown by experiments conducted at the Worcester Polytechnic Institute and this is that the pressure on the shaft bearings increases with the load. The old theory was that the sum of the tensions remained constant. That is, as the load came on, the tension on the tight side increased, while the tension on the slack side

decreased,— the sum remaining constant and depending upon the original tightness of the belt when put on.

Experiments have shown that as the load comes on, the belt on the tight side stretches more than the slack side contracts, the result being that the sum of the tensions increases, thus bringing a greater pressure on the bearings. This is probably due to the variation in the modulus of elasticity as effected by the element of time. If the belt was non-elastic as on a chain drive, the pressure would increase directly as the load, while if the belt were perfectly elastic and could stretch and contract instantly, the pressure would remain constant.

At the conclusion of the paper Mr. W. W. BIRD produced a model similar to the diagram equipped with belts and exhibited it, explaining as follows:

I have here this little model which is designed to show the effect of belt creep. I will first put on a small belt which is quite elastic, much more so than a leather one and therefore better adapted for this purpose. This pointer is geared on the back to the driven pulley and travels with it while the dial is a part of the driving pulley. As long as the two pulleys are running at the same rate, the pointer and dial also keep together. When a load is applied as I now do by means of this brake on the driven pulley, you see that the pointer begins to lag. The driver is running faster than the driven and this is due to creep. If the load is constantly increased, the creep will increase up to its limit which is reached when the driven pulley ceases to turn and regular slip takes place, generally resulting as you see in the belt coming off.

I will now put on a second or rider belt for the purpose of

showing the effect of a double belt or what tends to take place in a double belt and what does take place in a compound or rider belt. I will place this small wire with the arrow head between the two belts. If the belts move relatively to each other the wire is rotated and the arrow revolves. We will start with the arrow pointing toward the centre of the pulley and as you can see it does not move except with the pulley. As the belts come off the pulley and pass to the other pulley the arrow revolves, showing that the rider belt is creeping along the under belt. This is due to the fact that the rider belt while on the pulley is further away from the centre and must go on and come off faster than the under belt. If the two belts were glued together or made into a double belt, then this creep would not take place but internal stresses would be set within the belt.

By placing this arrow with the wire between the face of the pulley and the under belt, we can show the point at which the creep of the belt on the pulley commences. With no load you see the arrow points to the centre during the half revolution. With this load on you see the arrow commences to revolve at a point about thirty degrees from the end of the half revolution. This is the point where creep commences for this load. The point works back as the load is increased until the creep extends over the entire arc of contact and then regular slip takes place.

There are two points which it has been my object to bring out in this paper: First, the necessity of taking into account the belt creep if it is desired to know exactly how two pulleys are to be relatively speeded; and secondly, the fact that it is impossible to avoid some loss of energy in belt transmission. A great many agents and advertisements make the claim that certain pulley coverings or belt dressings will avoid all losses. The loss due to creep cannot be prevented in any way, if the belt is elastic as it must be, then there will be stretch and reaction as it goes from one side to the other and the driven pulley is bound to lose.

The PRESIDENT. Are there any questions on this subject?

Mr. CHARLES F. CHASE. I would like to ask the speaker how he determines where creep stops and slip begins?

Mr. W. W. BIRD. Creep ceases and the real slip begins when the point where the arrow turns, as I have shown on the model, is carried back to the first point of contact of the belt with the pulley. In other words, when the creep extends over the entire arc of belt contact, it ceases to be creep and becomes slip. In practice it is hardly possible to determine the point where creep commences but it is generally possible to recognize real slip by the sound. Of course creep is a slipping of the belt on the pulley over more or less of an arc and this is shown by the polishing of the surfaces of the pulleys when the belt and its tension is more than sufficient for the load.

Mr. THOMAS H. SMITH. Mr. President, I would like to ask the speaker if the same thing occurs in rope driving?

Mr. W. W. BIRD. Yes, sir, the same thing takes place in rope driving. Of course, in a chain drive it does not take place. This, however, is not due to the positive hold between the chain and the wheel but to the practically non-elastic belt. Creep would take place if the chain was elastic due to the stretching on the tight side. Imagine an elastic chain drive with the pitch on the driver 2" and on the driven 1" while the number of teeth is the same on each and the load and elasticity being such as to just stretch 1" on the slack side to 2" on the tight side, there would be no slip but as the links came off the driven they would double in length and the driver would run twice as fast as the driven. In other words, with no slip we could have fifty per cent. creep.

The PRESIDENT. Any other questions?

We come now to the last paper on the program, Mechanical Stokers by Mr. ELWOOD E. TAYLOR of Boston.

AUTOMATIC STOKERS.

ELWOOD E. TAYLOR, Boston, Mass.

In order to present the subject of autotmatic stokers in as comprehensive a manner as possible, it will be necessary not only to compare automatic stoker practice with hand-fired practice, but also to compare one type of stoker with another. This places the writer in a very embarrassing position, as he is the father of a particularly healthy specimen of the under-feed type of stoker; so, in view of this condition of affairs, he will, in making the comparisons between the different types of stokers, reserve his particular stoker until the last, so that the other stokers may be brought prominently before the attention of those present, thus avoiding any suspicion of partiality.

The claim has been repeatedly made, and in all sincerity by engineers of unquestioned ability, that automatic stokers cannot improve upon the results obtained under hand-fired conditions, provided the hand-fired boilers are properly operated. It is very true that hand-fired results improve with the quality of firing, but it is also true that the results always bear a fixed relation to the quality of firing, and as it is impossible to secure firemen who will stand up in front of a boiler during an entire watch and throw in coal in small quantities and at frequent and regular intervals, the efficiency of a hand-fired plant must of necessity depend entirely upon the ability and disposition of a class of labor which at its best is largely interested in its own personal comfort.

In a general sense, an automatic stoker accomplishes but little

in the line of efficiency that a first class expert fireman cannot accomplish in hand-fired practice, provided he is able and willing to work hard during his entire watch. It is, however, impossible to secure this class of firemen and as an automatic stoker operates a boiler under conditions most favorable toward high efficiency, viz: introduces coal into the furnace in small quantities and at frequent and regular intervals, it is able to make a first class fireman out of very ordinary material, as the fireman's duty is limited to keeping the hopper filled with coal and to properly cleaning the fire.

Specifically speaking, however, an automatic stoker accomplishes five results which are absolutely impossible under hand-fired conditions. In the first place it introduces coal into the furnace without admitting cold air to destroy the efficiency and injure the boiler. In the second place it burns the coal in such a way that the volatile gases are thoroughly burned, giving up to the boiler heat which is, to a great extent, lost in hand-fired practice. In the third place it keeps the fire automatically sliced without admitting cold air to the furnace. In the fourth place, if properly designed, it allows the fire to be cleaned running, without loss of efficiency or capacity, and without admitting cold air to the furnace and in the fifth place, if properly designed, it controls the amounts of air and coal in such a way that they always bear a fixed relation each to the other, irrespective of the rating at which the boiler is being operated. This fifth accomplishment is a most important factor in the economy of a plant, as it not only absolutely guarantees the highest possible constant efficiency throughout the entire year, but relieves the fireman from all responsibility in connection with maintaining the efficiency. Automatic stokers are divided into two general classes, viz: the over-feed and the under-feed. There are a large number of over-feed stokers on the market, prominent among which is the Roney stoker, which we use for an illustration of this type. (See Figure 1).

There are three under-feed stokers on the market at the present time, viz: the American, the Jones and the Taylor Gravity.

FIGURE 1. — THE RONEY STOKER.

The over-feed stoker receives its name from the method employed for introducing the fuel into the furnace, the method of operation being as follows, viz: the fuel, having been introduced into the hopper at the front of the boiler, either by hand or by coal-handling machinery, is forced by a platen or flat pusher-plate onto an inclined grate. At the front of the furnace and immediately over the point at which the coal enters, is a fire-brick coking-arch extending from side to side of the furnace. As the fuel is forced by the pusher-plate onto the inclined grate, it passes beneath the coking arch and becomes thoroughly coked. The inclined grate being actuated by the same shaft that operates the pusher-plate, forces the burning coke down the slope toward the dumping grate at the rear of the furnace. During this operation, the coke is being burned, until at such time as it reaches the dumping grate, it is reduced to a mixture of coke, ash and clinker. The principal advantage of this type of stoker over the first mentioned under-feed stokers is that of the dumping-grate at the rear of the furnace. This

grate is dumped at proper intervals, depending upon the rate of combustion, and the ash and clinker is dropped into the ash-pit without interfering with the operation of the boiler.

The under-feed stoker, a view of which is shown in Figure 2, and a cross section in Figure 3, operates in an entirely different

FIGURE 2.—THE JONES STOKER.

manner, as follows, viz: the fresh fuel is introduced into the hopper at the front of the boiler and is forced by a ram operated by steam, into a retort extending longitudinally the length of the furnace. As the coal enters the retort, it is forced upward into the fire, during which operation it becomes thoroughly coked and the gases are liberated. The forced draft, entering the furnace through tuyere-openings along the top of the retort mixes with the gases as they are distilled, forming a combustible mixture, which, passing through the body of burning fuel is completely burned, resulting in an absolutely smokeless furnace when the stokers are not forced beyond their proper rating. The principal advantages of the under-feed stoker over the over-feed stoker are the smokeless furnace and the readiness with which it responds to a sudden demand for steam. This quick response to sudden demands for steam is made possible by the large body of burning fuel which is carried at all times in the furnace. With an experience of ten years in the stoker business and an intimate knowledge of both the over-feed and under-feed stokers, the writer designed the Taylor Gravity Under-Feed

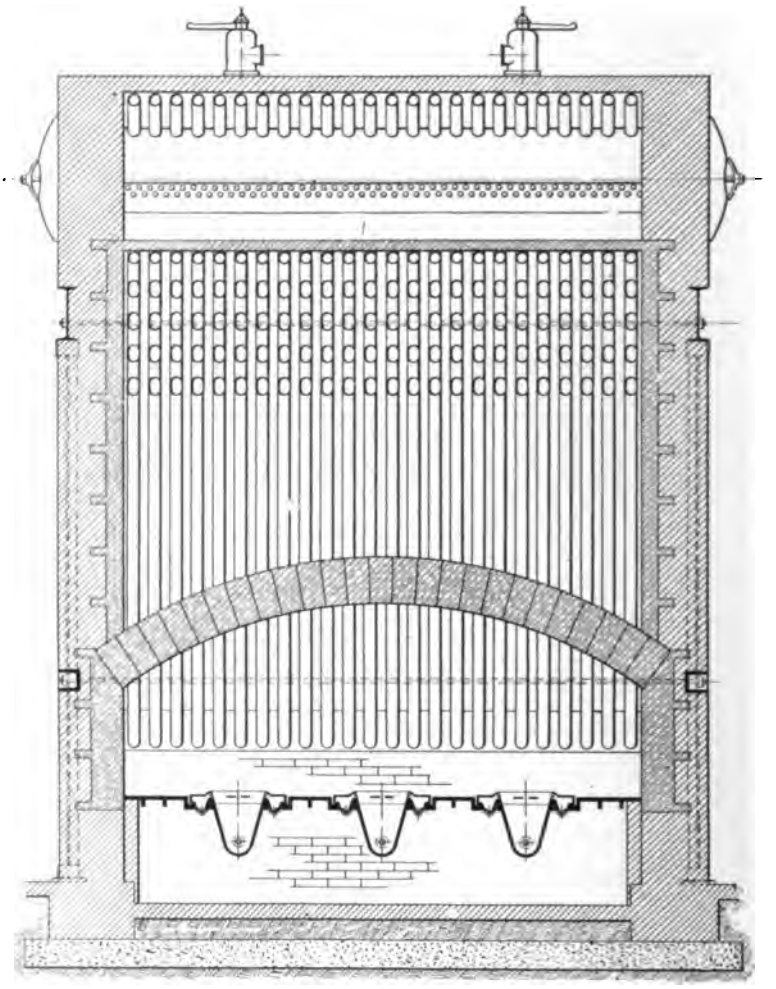


FIGURE 3. — THE JONES STOKER. (Cross Section).

Stoker, with the object in view of producing a stoker which should not only possess all the advantages of the over-feed and under-feed stokers, without their faults, but should in addition, accomplish four results which no stoker, up to the present time has accomplished, viz: first, the proportioning of the air and

coal so that the ratio remains constant at all rates of combustion; second, the production of a stoker which would at all times and under all conditions of service operate at one half the rating at which any other stoker of the present time operates, when burning the same amount of coal per boiler per hour; third, the production of a stoker which would, when occasion required, burn double the amount of coal per boiler per hour burned by any other stoker now on the market; fourth, the production of a stoker which would be absolutely smokeless in operation, even under the forced conditions necessary in every plant operating at the present time.

In order to accomplish these results, the under-feed principle of stoking was adopted and in order to secure the necessary tuyere area required to maintain a fixed ratio between the air and coal, and at the same time, secure the requisite coking surface necessary in order to maintain the extreme rate of combustion, double the number of retorts per furnace were used.

The fixing of the ratio between the air and coal is accomplished by analyzing continuous samples of flue gas from each boiler, and once fixed, remains practically constant irrespective of the rate of combustion, as there is absolutely no adjustment between the blower and stokers, the blower being direct connected to the blower-engine and the stokers operated direct from the blower shaft by means of counter shafts, gears and silent chains. This scientific determination of the amounts of air and coal to be used absolutely guarantees the highest possible fixed constant efficiency and economy under all the varying conditions of operation throughout the entire year and from year to year, guaranteeing against errors of judgment and peculiarities of disposition of fireman, as no fireman can introduce more coal into the furnace than can be properly and efficiently burned, neither can he admit more air into the furnace than is necessary to support combustion.

By using double the number of retorts, but one half the amount of coal per hour is fed to each retort, resulting in a very slow motion of operating parts, which must of necessity result

in longer life and low cost of maintenance of these parts. Each retort, burning but one-half the amount of coal per hour burned per retort by any other under-feed stoker, delivers to the boiler but one-half the volume of heat per hour, resulting in longer life to the tuyere-plates and dumping-plates, these being the only parts exposed to the action of the fire.

The ability to burn the maximum amount of coal per boiler per hour which is made possible by the use of double the number of retorts per boiler is an advantage which will readily appeal to engineers in connection with power-plants where varying and extreme loads are the rule and especially so when taken in connection with the fact that the fires are cleaned running, without first being burned down, by means of dumping-plates located at the rear of stokers, and without loss of efficiency or capacity. By the use of this stoker, sudden demands on the boiler calling for extreme rates of combustion are readily met, as a heavy body of fire is carried at all times.

In the Taylor Gravity Under-Feed Stoker, the elimination of smoke is due directly to two conditions, viz: — first, by using double the number of retorts per boiler and burning but one-half the amount of coal per retort per hour, combustion is necessarily slow. The coal has twice the length of time for coking, the volatile gases which cause the smoke are thoroughly liberated and, mixing with the air as it enters the fire through the tuyere-openings below the body of burning fuel, form a combustible mixture, which passing through the body of burning coke is completely burned. Second, the ratio of air and coal being scientifically fixed and remaining constant at all times and under all conditions, ensures the proper amount of air to completely and efficiently burn the required amount of coal, thus guaranteeing the best possible conditions for thorough combustion. This combination of conditions, each favorable in itself toward complete and thorough combustion presents the only possible solution of the smoke problem.

In operation, the Taylor Gravity Under-Feed Stoker is extremely simple. The speed of the blower-engine which operates

both blower and stokers, is controlled directly by the steam-pressure, relieving the fireman from all responsibility as to the amount of coal to be fired and the amount of air necessary to support combustion. This being the case, his duties are limited to keeping the hoppers filled with coal, and to dumping the burned out part of the fire at the rear end of the furnace at proper and regular intervals. In cleaning the fire, the body of burning coke, which is the business end of the fire, is not disturbed, the ash and clinker only being dumped into the ash-pit or hopper. The speed of the blower-engine is controlled by means of a chronometer valve in the blower-engine steam-pipe, the valve being connected to the damper regulator. The damper in the main flue having been disconnected from the damper-regulator and locked wide open, the only work left for the damper-regulator is to operate the chronometer valve. As the steam-pressure rises, the damper-regulator closes the chronometer valve, slowing down the blower-engine, fan-blower and stokers in the same proportion, delivering a smaller amount of coal to the boilers, and a smaller volume of air in proper proportion, to burn the coal. If the steam-pressure falls, the damper-regulator immediately opens the chronometer valve, speeding up the blower-engine, fan-blower and stokers, delivering larger amounts of air and coal in proper proportion.

The Taylor Gravity Under-Feed Stoker is built with a view toward long life and few repairs. Weighing as it does over three times as much as any other under-feed stoker per boiler, the weights are so distributed that the parts subjected to the greatest strain are most heavily built. The cracking of retorts, a very serious fault with other types of under-feed stokers, is entirely eliminated, as the retorts are made in halves, and are kept cool by the air for combustion supplied by the fan-blower. No moving parts are subjected to the action of the fire, all working parts being outside the boiler and easy of access. All parts exposed to the action of the fire are air-cooled and easily removed, as they are not held in place by bolts or nuts, but are held in position by their own weight. The burning out of

tuyere-blocks has been practically eliminated, as the blocks are made in the form of plates, but one and one-half inches thick. As these plates rest one upon another, only their sides are subjected to the action of the fire, thus effectually preventing cracking, which rapidly develops into a burned out tuyere-block. The tuyere-plates, resting one upon another in the form of steps allow fine ash to accumulate on each step, thus protecting the point of each plate. The tuyere-plates are also constructed so that no coal or fire can work back into the air box through the tuyere-plates themselves, thus removing the chief cause of burned out tuyere-blocks and cracked retorts in other underfeed stokers. The tuyere-plates are also designed so that the air, entering through the tuyere-openings, comes in contact with the fuel as it is in the act of spreading over the tuyere-plates, in which loosened condition, the air can easily pass through every portion of the body of burning coke.

In order to prevent any possible breakage, due to introducing a piece of iron into the hopper with the coal, shearing-pins, made from ten-penny wire nails, are inserted into steel bushings in the chain-gear and clutch on the speed worm shaft. These pins will easily transmit the small amount of power necessary to operate the stokers, but will shear off if the upper plungers are obstructed. The durability of the operating parts can best be illustrated by the speed at which the crank-shaft revolves. When operating the boiler at 150 per cent. of its rating, the crank-shaft makes about thirty revolutions per hour, or about one revolution in two minutes. This slow motion would have a decided tendency toward prolonging the life of the working parts indefinitely.

In designing the Taylor Gravity Under-Feed Stoker, great care was taken to so construct it that the petty annoyances found in all other stokers should if possible be entirely eliminated.

By referring to the accompanying cuts of this stoker, see Figures 4 and 5, it will be seen that the multiplicity of steam cylinders, with their attending steam and exhaust piping and leaky

FIGURE 4. — TAYLOR GRAVITY UNDER-FEED STOKER.
(Looking from bridge wall towards the front.)

FIGURE 5. — TAYLOR GRAVITY UNDER-FEED STOKER.
(Side View.)

glands, found in all other under-feed stokers, has been entirely eliminated and in their place, cranks have been substituted. These cranks are operated directly from the blower-engine and as the efficiency of both the reciprocating engine and the steam

pump is well known, it can readily be seen wherein the Taylor Gravity Under-Feed Stoker has the advantage.

We have made one elimination which will appeal most strongly to engineers who have operated other types of under-feed stokers, and that is the trouble with cracked and burned out boiler fronts and fire doors. We have absolutely no trouble with over-heating of fronts. This is due to the fact that the air, entering the furnace through the tuyere-openings, carries the heat away from the front of the boiler, the direction of the air as it enters the furnace being horizontally backward, toward the bridge-wall.

The Taylor Gravity Under-Feed Stoker, operating as it does at a very low rating, in such a way that the coal is fed into the furnace one-half a shovel full or sixteen pounds at a time at frequent and regular intervals without opening the fire doors, in such a way that the volatile gases are thoroughly burned, in such a way that the fires are kept automatically sliced and thoroughly cleaned without opening the fire doors and without loss of efficiency or capacity, in such a way that the amounts of air and coal always bear a fixed and constant relation each to the other, thereby ensuring a constant efficiency at all rates of combustion and in such a way that the furnace is absolutely smokeless up to and beyond 150 per cent. of the rating of the boilers, must of necessity secure a higher efficiency of furnace than any other stoker now on the market, as no other stoker has such absolutely control over the essential requirements necessary to insure perfect combustion.

The Taylor Gravity Under-Feed Stoker, limiting the duties of the fireman as it does to keeping the hoppers filled and dumping the ash and clinker, requires less attention than any stoker now on the market, hence the saving in labor.

Another saving which bears a marked contrast to any other under-feed stoker is that of the power for operating the stokers. The green fuel, instead of being forced upward into the fire, as in the case of all other under-feed stokers, is forced horizontally backward and downward toward the bridge wall, which operation

cannot help but require a smaller amount of power than in the case of all other under-feed stokers, where the green fuel is forced into the retort against a head of fuel.

Mr. GEORGE P. GRANT, Jr. I would like to ask if these stokers are so designed that they will work under different qualities of coal — that is, whether you can use the low-grade all-rail coal or the Georges Creek.

Mr. ELWOOD E. TAYLOR. They will operate with any form of bituminous coal.

Mr. GEORGE P. GRANT, Jr. Without change?

Mr. ELWOOD E. TAYLOR. Without change. That is to say, we have a blast gate under each stoker which regulates the amount of air. To fix the ratio between the air and the coal we take samples of flue gas and analyze them, determining the amount of oxygen, the amount of carbonic acid gas and the amount of carbonic oxide. From these elements we determine the number of pounds of air used per pound of coal. No two coals require the same amount of air to completely burn them, but this can be overcome by opening the blast gate or closing it a little, simply to keep the fire the proper height, the tuyere-openings of the stoker being so designed that the proper amount of air will go through them at a certain pressure, so that with any quality of soft coal the conditions are readily met.

DINNER

GIVEN BY THE NEW ENGLAND COTTON MANUFACTURERS' ASSOCIATION
IN HONOR OF THE LANCASHIRE PRIVATE COTTON INVESTIGATION
COMMISSION.

In place of the usual fourth session of the Association, a dinner was given by the New England Cotton Manufacturers' Association, at Hotel Brunswick, Boston, Thursday evening, April 26, in honor of the Lancashire Private Cotton Investigation Commission. The members and guests gathered in the hotel for a reception to the visitors at six o'clock. After half an hour spent in the parlors, President MACCOLL, escorting the Chairman of the Lancashire Commission, Mr. H. W. MACALISTER, led the way to the banquet hall.

NEW ENGLAND COTTON MANUFACTURERS' ASSOCIATION

DINNER

IN

HONOR OF THE LANCASHIRE PRIVATE COTTON INVESTIGATION COMMISSION

Hotel Brunswick, Boston,

Thursday, April 26, 1906.

Members of the Commission.

H. W. MACALISTER, Oldham,
W. J. ORR, Rochdale,
HENRY P. GREG, Manchester,
GEORGE MOORES, Manchester,
THOMAS D. BARLOW, Manchester,
G. LENNARD BOLDEN, Machester,
Also Monsieur JULIEN LEBLAN, Lille, France.

The Meeting Committee.

CHARLES T. PLUNKETT, *Chairman.*

E. W. ATKINSON,
NATHANIEL F. AYER,
DANIEL J. DANKER,
JOHN O. DEWOLF,
EDWIN FARNUM GREENE,
GEORGE B. MORISON,
FRANKLIN D. WILLIAMS.

MENU.

Cape Oysters
Cream of Asparagus Souffles
Consommé Royale
Boiled Fresh Salmon, Hollandaise
Cucumbers
Roast Spring Lamb, Mint Sauce
Potatoes Natural — New Wax Beans
Lobster a la Newburg en caisse
Emerald Punch
Roast Golden Plover
Chiffonade Salad
Fancy Assorted Cake
Neapolitan Ice Cream
Strawberries
Cheese
Coffee — Apollinaris

The guests at the head table were:

James R. MacColl,
Hon. Eben S. Draper,
William D. Hartshorne,
Gen. William F. Draper,
George A. Ayer,
H. W. Macalister,
William H. Loftus,
George Moores,
Charles T. Plunkett,
Henry P. Greg,
Roscoe S. Milliken,
W. J. Orr,
George P. Grant, Jr.,
G. Lennard Bolden,
Christopher P. Brooks,
Julien Le Blan,
C. E. Roberts,
Thomas D. Barlow,
Stephen A. Knight,
Frederick P. Fish,
Herbert E. Walmsley,
J. Linzee Snelling,

William Whitman,
C. A. Green,
Robert A. Cummings,
Gen. Thomas Sherwin,
Frank P. Bennett, Jr.
Col. Albert Clarke,
D. M. Thompson,
John Bruce McPherson,
C. J. H. Woodbury,

At the other tables the following were seated:

E. W. Atkinson,
Nathaniel F. Ayer,
J. W. Ballard,
L. E. Barnes,
E. N. Bartlett,
William M. Batt,
Albert Birch,
N. B. Borden,
Arthur T. Bradlee,
J. Frank Braids,
E. R. Bullock,
John H. Burns,
Frank H. Burt,
Harry W. Butterworth,
Charles H. Child,
Charles H. Clark,
T. J. Clexton,
Frank B. Comins,
James A. Cooper,
Peter H. Corr,
Stuart W. Cramer,
Daniel J. Danker,
John O. DeWolf,
Henry C. Dexter,
Alexander Diebold,
Ezra Dixon,
Frank J. Dutcher,
William Firth,
Frederick A. Flather,
M. F. Foster,
A. L. Fowler,
Simon Friedberger,
A. C. Gardner,
John Gregson,
Frank J. Hale,
Charles L. Harding,
Frank Hartley,
W. M. Hastings,
Edgar F. Hathaway,
C. H. Hobbs,
Franklin W. Hobbs,
H. S. Houghton, Sr.,
Frederic W. Howe,
Joseph G. Jenks,
L. M. Keeler,
Carl T. Keller,
J. C. King,
Henry G. Kittredge,
Evan A. Leigh,
William L. Lyall,
John W. Manley,
John P. Marston,
Thomas Mayor,
B. Frank Mebane,
H. P. Meikleham,
John T. Mercer,
M. H. Merrill,
H. A. Metcalf,
N. L. Moore,
Frank N. Nagle,

H. W. Nichols,
William R. Noone,
J. Nelson Parker,
Charles E. Pervear,
Albert Phenis,
C. Eaton Pierce,
H. S. Pratt,
T. H. Rennie,
Frank W. Reynolds,
Alfred Sagar,
Robert Schaellibaum,
Lewis T. Shurtleff,
Louis Simpson,
John Skinner,
R. P. Snelling,
Antonio Spencer,
and others.

A. E. Sproul,
Samuel H. Steele,
Ralph L. Stevens,
William J. Stewart,
Wallace I. Stimpson,
James Strang,
A. C. Thomas,
D. A. Tompkins,
Henry E. Turner,
William A. G. Turner,
H. W. Wadleigh,
George H. Waterman,
Walter S. Watson,
W. T. Whitehead,
Malcolm D. Whitman,
Franklin D. Williams,

At the conclusion of the banquet, President MACCOLL opened the after dinner exercise with the following address.

ADDRESS OF JAMES R. MACCOLL, PRESIDENT.

It gives the New England Cotton Manufacturers' Association great pleasure to have this opportunity of entertaining the members of the Lancashire Private Cotton Investigation Commission. We recognize that these gentlemen represent, and are our commercial rivals. England and America both want a much larger share of the world's cotton trade. They desire to sell more goods in America, and nothing would please us better figuratively speaking, than "to carry coal to Newcastle" by selling our product in Lancashire. Englishmen are said to be predatory and we, their descendants, have inherited their instincts. We have been continually in the past adopting every improved cotton machine that they have brought out, and in recent years they are paying us back in our own coin by introducing the latest and most improved American labor saving devices, although we don't think they need them half as much as we do.

It is one of the finest features of modern civilization that business competitors are frequently the best of friends. They realize that friendly rivalry is better policy than antagonism, and still more that no petty question of dollars and cents should interfere with the more profound relations of universal brotherhood that are of eternal value.

And so we welcome these English gentlemen to our land. We rejoice that old animosities are buried, that Old and New England understand each other better than in days gone by. New England is proud of Old England, and Old England is proud of New England, one in blood, in ideals and in destiny.

I had the pleasure of travelling through the South with our guests, and I can assure you that they are keen and thorough investigators. A recent newspaper comment says that probably they know more about cotton growing and handling conditions in the South than our New England manufacturers do, and I am not sure but that this is true. They visited every cotton growing state and met several hundred planters, factors, buyers, ginners, compress owners, and shippers. Their lips are to some extent sealed until their report is presented at home, but they will excuse me if I say, that the investigation will show that there are still boundless possibilities for increased production of the raw material in our Southern States, both by developing new lands and also by more intensive cultivation, that will increase the yield to a bale or more for every acre planted. It is encouraging also to know that the boll weevil has been conquered, largely through the scientific work of the Agricultural Department, and that eventually instead of being a menace to cotton production it will prove a blessing by encouraging earlier planting and picking. There is also general admission that old methods must give place to new. If labor is scarce then the productive capacity of each man must be greatly increased. Many minds are at work on agricultural implements, mechanical cotton pickers, improved gins, and baling presses, and it is probable that an era of advancement is at hand.

The visit of our guests has undoubtedly been beneficial and I

strongly recommend that a similar expedition through the South should in the near future be made by a delegation of our northern spinners. Growers and spinners should get closer together. A better understanding of each will result beneficially to both interests.

Gentlemen of the Commission, permit me again to express our delight and pleasure in having you with us, and our hope that cordial and friendly relations will always continue between our countries and our industries.

President MACCOLL. Gentlemen, the best way to show our high appreciation of the splendid address that was delivered to us yesterday by the Lieutenant-Governor of Massachusetts is to encore him, (Voices, "Hear! Hear!") and this we do most heartily. His Honor, EBEN S. DRAPER, Lieutenant-Governor of Massachusetts. [Applause.]

REMARKS OF HIS HONOR, EBEN S. DRAPER.

Mr. President and fellow members of the cotton manufacturing and cotton machinery industries [laughter and applause]: I have first to apologize to your President and to you for not having been here in time after the very courteous invitation which I received from your officials. But the terrible disaster at San Francisco has made people busy all over the country, and today the Relief Committee of Boston was engaged in meetings down town all day long and I was unable to get away from there until nearly seven o'clock tonight, so that it was impossible for me to have the pleasure of dining with you, which I should have appreciated very much indeed. Under these circumstances I can truly say that I had no expectation of making any speech and what I say must be entirely impromptu, and I am going to ask you to excuse anything I may say tonight because of the very flattering remarks that the

President has made about what I said yesterday. I trust that this will not count and that you will only remember that speech if that was good.

It gives me a great deal of pleasure to second the remarks of your President and to say to these gentlemen from England that we are delighted to welcome them, not merely for the business meeting of the New England Cotton Manufacturers' Association, or The National Association of Cotton Manufacturers, but also at the festive board, where we can meet them as friends and tell them individually and collectively how glad we are to see them and how pleased we are to have a chance to become better acquainted with them.

I was very much impressed in talking with two or three of these gentlemen about their trip through the South. I sincerely trust all the information they received there was founded definitely on fact. But when I heard some of the stories about the large things that were going on down there, I remembered with great pleasure some of my own trips to the South and I felt possibly that, to use an American phrase, somebody had pulled their leg a little. [Laughter.] Now, gentlemen, I hope that is not so, — I don't want to malign anybody. But at the same time I really was tremendously impressed with what they told me, and I think that what your President said is very true that they have realized the great importance of the manufacturer coming into close contact with the grower before we have realized it. And I want to second most heartily the suggestion of your President that I believe there is nothing more important for the New England Cotton Manufacturers' Association to do than to come in direct contact with the growers of cotton in the South, to find out the circumstances that prevail there, and I believe they can do a great deal for their own advantage.

I was very much impressed with the address of your President yesterday and I want to say to you gentlemen that I am going to read it very carefully. I thought there were many suggestions there of great importance and it certainly was a model and a very able address for a presiding officer of any

association [applause]. These gentlemen are going back to England. Nothing has ever impressed me more than the manufacturing industries of Lancashire. To go to that little bit of a section which could almost be put into one-fiftieth part of the state of Texas, where these gentlemen have been, and to find there in busy operation 25,000,000 — yes, 45,000,000 spindles, and to know that 6,000,000 more spindles are ordered for new mills in that one little section, it makes us in this country feel small. And while they have confessed to us or some of us that they do not fear immediate competition from the American manufacturer in foreign markets, I want to say to them that while they are probably right at the present time, we are going to do our best to disabuse them of that idea in the future. [Laughter and applause.]

Gentlemen, I am not going to take up your time. I know there are many men here to speak to you. But I want to say to our friends that I hope their journey home will be a pleasant one and I trust they will carry back to their associates over there the kindly greetings of this Association and of each individual member. [Applause.]

President MACCOLL. Gentlemen, cotton manufacturing is heir to so many ills, beginning with reduced acreage and the boll weevil and ending with the finished product, that we are sometimes glad to remember that there is another great raw material and that the human family is not entirely dependent upon cotton. We are honored this evening by the presence of the President of the National Association of Wool Manufacturers, who is also a prominent cotton manufacturer and as such a member of our Association, Mr. WILLIAM WHITMAN. [Applause.]

INDUSTRIAL INTERDEPENDENCE.

By William Whitman.

As president of the National Association of Wool Manufacturers, and personally, I take great pleasure in extending most cordial greetings to the honored guests of the evening, and in wishing them every success in the attainment of the objects of their visit to this country.

There are gathered here representative men who are actively engaged in the greatest of textile industries — the manufacture of cotton. They represent the two leading cotton manufacturing nations, Great Britain and the United States. I name these countries advisedly in the order of their rank. They are today the chief competitors for the cotton goods trade of the world.

What is this cotton industry in which the United States and Great Britain are the leading factors? What is its scope? What has been its growth, and what are the reasons for that growth?

It is in considering these questions that I have been brought to realize, during the course of my daily work, how dependent the growth of the cotton industry has been upon the corresponding development of other national industries. I have been led to study, in passing, the mutuality of relationship between our greater industries, and I wish to suggest to you certain results of that study. My subject for this evening, therefore, I have entitled, Industrial Interdependence, with especial reference to cotton manufacture.

It is difficult to measure the comparative value of cotton manufacture. Opinions will differ, and I, perhaps, am not an

impartial judge. It is unnecessary to give statistics, however, to show that the cotton manufactures form the cheapest, most useful, most indispensable and most extensive part of the clothing of the great human family. Mingled and intermingled with almost all other fibers and in all forms, cotton is worn by mankind. Actually and figuratively, cotton lies nearer the human heart than any other substance for clothing which the art of man has produced. We walk in it by day, and we sleep in it by night. With the exception of food, it is difficult to conceive what could have a greater value.

But cotton befriends us in other forms than that of clothing. It utilizes and makes productive $2,000,000,000 of capital; it gives healthy employment to many millions of work people. In the form of sails it propels our ships, in the form of tents it protects us from the elements, and today we read that it was through the power of a great explosive made from cotton that a large portion of the city of San Francisco was saved from ruin.

The versatility of cotton, so to speak, is marvelous. Cotton is made into our heaviest canvas, and yet it forms the basis of our lightest and most delicate muslins. By a simple process it is transformed into artificial silk, which excels in brilliancy the product of the silk worm. Cotton can be twisted into a rope heavy and strong enough for a ship's cable, and yet spun into almost invisible threads. There are authentic records to show that cotton has been spun as fine as number 2150, a thread so delicate that one pound of it would extend 1,026 miles. This seems fanciful, but as long ago as 1851 a muslin garment was made for Queen VICTORIA from cotton spun to number 460, a number so fine that a man could readily carry enough in his portmanteau to extend 5,000 miles. The spinning of cotton to such extreme fineness is not commercially practicable. It is a fact, however, that a considerable quantity of cotton is spun today as fine as number 250, four pounds of which would extend from this city to the nation's capital.

I mention these facts, not only to illustrate the varied uses of cotton and its value to mankind, but to enable you to see clearly

that such varied uses, on any large scale, have only been rendered possible by the development of coal and iron, and the other industrial products which inventive genius has so successfully applied to the mechanic arts. The history of this industry is, in a sense, the history of other allied industries.

The modern system of cotton manufacture had its origin in England, and it was a natural origin. The conception of the system was based on the discovery of the means of applying mechanical power to perform the work that in earlier days had been performed entirely by hand. Its birth may be said to be coincident with the invention of the steam engine in England by JAMES WATT in 1770. In so short a sketch I shall not attempt to convey to your minds the significance of this invention. That England appreciated the wonderful benefit bestowed by WATT upon the world is evidenced by an inscription written by Lord BROUGHAM and engraved at the command of the king upon WATT'S monument.

"Not to perpetuate a name
Which must endure while the peaceful arts flourish,
But to show
That mankind has learned to honor those
Who best deserve their gratitude,
The King,
His Ministers, and many of the Nobles
And Commissioners of the realm,
Raised this monument to
JAMES WATT,
Who, directing the force of an original Genius
Early exercised in Philosophic research,
To the improvement of
The steam-engine,
Enlarged the Resources of his Country,
Increased the Power of Man,
and rose to an eminent place
Among the most illustrious followers of Science
And the real Benefactors of the World."

As the late CHAUNCEY SMITH said, "Probably no other mechanical conception ever entered so directly and profoundly into the commerce of the world, ever so enlarged its volume and affected the values of commodities as the steam engine in its various forms."

England also had coal and iron and a supply of cotton from her colonies. She possessed, therefore, all the necessary elements for the evolution of cotton manufacture. A glance at her industrial history from that time on strengthens the impression that the development of her cotton industry has been commensurate with and dependent upon the corresponding development of her other national industries, coal and iron mining, the manufacture of iron and steel, and their application to the mechanic arts.

In the invention, construction and application of mechanical power England has always been fortunate. The inventive genius for transforming raw materials into machines for increasing the productive power of man is a heritage of her people, and it is this, coupled with her national resources, that has made England today supreme in cotton manufacture. Her inventions in cotton machinery measure this progress.

Shortly before WATT invented the steam engine, the spinning and weaving of cotton was a household industry. A necessary increase in the supply of weft or filling for yarns was created by HARGREAVES' invention of the Spinning Jenny. A necessary supply of warp for yarns was created by ARKWRIGHT'S invention of the Throstle Spinning Frame in 1769. The great demand for a general increase of yarn was met by CROMPTON'S invention of the Mule about 1780, and the consequent demand for greater weaving capacity was met by CARTWRIGHT'S invention of the Power Loom in 1785. Up to this time the supply of raw cotton, though limited, has been equal to the demand. Great Britain depended for her supplies almost wholly upon the West Indies, and had received none from her American colonies. Her entire importation in the year 1771 was less than 10,000 bales. As manufacture increased, and the uses of

cotton became more varied, the supply was inadequate and in 1788 there was fear of a cotton famine, which was averted, as we shall see, through the genius of an American inventor.

Increased trade created a need for cheaper and more efficient transportation. This need was filled by the invention of the locomotive by GEORGE STEPHENSON in 1825 and subsequent discoveries in metallurgy.

I can but refer to the significance of the invention of the locomotive, and to discoveries in metallurgy by such men as BESSEMER, SIEMANS and others, which have revolutionized the commerce and manufacture of all nations.

Of STEPHENSON it has been said that "No other Englishman has done so much for his fellow men, so much to change the social and economic conditions of society." Of metallurgy and its discoveries I repeat the statement of that eminent English economist, Mr. RICHARD COBDEN: "Our wealth, commerce, and manufactures grow out of the skilled labor of men working in metals."

STEPHENSON may be said to have given both the locomotive and the railroad to the world; BESSEMER and others to have brought the materials for their construction to their high perfection.

Thus far I have confined my remarks to England, but the same conditions underlying the evolution of the factory system there prevail in the United States. Our own country not only possesses all the advantages of England, but in addition has richer and more varied minerals, unparalleled water powers, and agricultural resources for an almost unlimited supply of cotton and the necessary food for life. Permit me to dwell for a moment upon the significance of our national progress during the past few decades.

First in importance is agriculture. In 1904 we raised more than twice as much corn as in 1870; more than one and one-half times as much wheat; more than three times as much oats; and more than four times as much barley. During the past thirty-five years our farm products have increased at a greater

rate than our population. In the calendar year 1905 we not only furnished our own people with better and cheaper food than in 1870, but in addition we furnished foreign countries with farm products amounting in value to $856,933,065.

How has this increase been possible? Here again is an example of the dependence of one great industry upon another. The development of our greatest industry, agriculture, has been largely due to labor-saving farming machinery and the facilities for transportation. Railroads were needed in order to open up our vast agricultural lands and to market their products; ships were needed to carry our surplus products to other countries.

An idea of the development in transportation may be obtained by a glance at the railroad system in this country. In 1870 there were only 52,922 miles of railroad in operation. Thirty-four years later 212,314 miles of railroad were being operated throughout the United States. This was nearly one-half the entire railroad mileage of the world. In 1904 we had in actual operation in the United States 48,658 locomotives. The work performed by these locomotives it is difficult to estimate. Thirty years ago, however, an engineer calculated that one locomotive performed the work of 1,200 horses. From this estimate it is safe to say that the locomotives in the United States today perform the work of more than 80,000,000 horses, more than four times the number now in this country.

What enabled the tremendous development in facilities for transportation to be made? We shall find the answer in the progress of the iron and steel industry during the past forty years. Men engaged in this industry have amassed colossal fortunes, which have caused discontent and envy among their fellows. In this connection, a few words may not be out of place. The needs of our people in the conduct of domestic and business life created so exceptional a demand for the products of the iron and steel industry that it has been abnormally profitable. Fortunes could not have been made, however, if their possessors had not contributed to the common good and filled a common need. Those that have been amassed cannot, as

many suppose, be stored in vaults away from the people. They must be used and they cannot be used to yield a stable profit without benefitting the people. In the physical world the stream flows from the mountain to the sea, but in obedience to a natural law, its waters return to the mountain. In like manner, in obedience to natural law in the industrial world, which may be termed economic law, the stream of wealth that flows from the people to any great industry will ultimately find its way back to the people.

As an illustration of this law, let us see how the waters of wealth that pour into the iron and steel industry return to the people. In 1903 the United States produced about 14½ million tons of steel. This was nearly three times the quantity produced in Great Britain and was more than 40 per cent. of the entire production of the world. Since that time our production of steel in this country has increased to more than 20 million tons a year, and it is fair to estimate that it now exceeds more than one-half of the world's production. But the magnitude of our iron and steel industry is not the only measure of its value. That value depends upon the varied uses to which steel can be put and to the importance of those uses in our everyday life. Our manufacturing, our transportation, and the utility of our agriculture depend upon iron and steel. Through iron and steel, and their attendant genius, coal, man is enabled to make use of almost the entire surface of the earth, moving over land by rail, across rivers by colossal bridges, and over seas in ships of steel. It would be impossible for me to catalogue the manifold uses of iron and steel. I merely suggest some extremes in their product to illustrate the scope of those uses.

Within the past year, for turbine use in one of the Cunard liners, a solid ingot of steel weighing 120 tons was cast by the W. G. Armstrong Co., Ltd., at Manchester, England. In this country several years ago the Bethlehem Steel Co. produced enormous steel ingots used in the manufacture of armour plate for our warships. Each of these solid masses weighed 275,000

pounds or 137½ tons. The Bethlemen Co. has also produced the largest crank shaft ever made. The ingot for this shaft weighed 120 tons, and the shaft when completed was 25 feet long, 3 feet 1 inch in diameter at one end, and 2½ feet in diameter at the other.

Thus are illustrated the massive uses of steel. Now, in contrast: I have iron wire drawn to one one-thousandth of an inch in diameter. It is so fine that it can be put through the eye of the smallest needle, and a pound of it would extend 72⅓ miles.

This wire demonstrates how raw material can be enhanced in value by skilled labor. A pound avoirdupois of iron in this form is valued at $1,814.40. A pound avoirdupois of our gold coin has a value of $271.32.

I have also a sample of pure steel which is nearly forty times more valuable than the iron wire. It is a delicate part of the watch known as the "pallet and fork" which I am told is sold to the watch repairer at the rate of $71,000 a pound. There are about 16,000 of these tiny parts to the pound avoirdupois.

Intermediary between such massive and such delicate products of iron and steel, we find farming implements, cooking utensils, instruments of construction — all materials and articles of absolute necessity. It is in these forms that the wealth that flows into the iron and steel industry flows back to the people. It is these forms which are the contribution of the iron and steel industry to the common good.

Mr. CARNEGIE is reported to have said, "Steel is king" and the report adds that his wife replied to this remark, "And coal is queen." If this be true, then certainly coal is the power behind the throne. Permit me to revert again to the pervading thought of this sketch. Great as steel has become, it depends upon coal for that greatness. On coal rests the inherent value of iron and steel. On coal, iron and steel our transportation depends. On all three the development and utility of our agriculture; and on them, perhaps, the cotton industry, and so on. Each enterprise has its place in the great industrial structure. Destroy or disable or cripple any one enterprise, and you

weaken the whole industrial structure, each remaining enterprise having to bear the burden of the extra strain. Each enterprise has its particular function, but in the complex development of our great industrial system in modern times, it is, perhaps, difficult to point out which enterprises in this great structure are the most important. If a foundation must be named, however, that foundation is, in my opinion, coal, and what a magnificent foundation we have in the United States. In 1903 our mines furnished nearly three-eighths of the entire world's production.

But opinions differ, and there are many who proclaim another king, a king whose rule in the past few years has made our Southern states flourish and prosper — cotton.

I have spoken of the cotton industry, its origin and evolution in England, and the names of great men whose inventions have caused that evolution. There is, however, an American whose name must not be forgotten. He was one of the great men of his time. His invention, as much as any other, stimulated the cotton industry throughout the world and it was his invention that tended to prevent the threatened cotton famine about 1790, to which I have alluded. This man was ELI WHITNEY, the inventor of the cotton gin. It was this machine that has rendered possible the necessary increase in the supply of cotton.

I wish to say a word about the two other American inventions that have increased the productive capacity of our cotton machinery. I refer to the Rabbeth spindle patented May 4, 1880, and the Northrop automatic loom patented June 3, 1891. Both these inventions were perfected for our industry under great difficulties, at great risk and expense and with unwearying patience, by George Draper & Sons and their successor, the Draper Company of Hopedale, Massachusetts. It is said that every cotton mill in the United States and many in other countries pay tribute to the DRAPERS. The tribute our country pays, however, is but the measure of their contribution to the common good, and to our industry itself. This Association, in recognizing that contribution, has erected in Philadelphia a

memorial of GEORGE DRAPER, and this Association honors his distinguished sons.

The development of the cotton industry in this country has been very rapid. The United States in the year 1904-5 produced more than 75 per cent. of all the cotton produced in the world. This supply has grown from about one million bales in 1831 to about 13½ million bales in 1904. In 1791 ALEXANDER HAMILTON stated in his report that there was but one cotton factory in operation in the United States, and that this factory had only 72 spindles. In 1905 there were in the Southern States alone 9,205,000 spindles, and there were in actual operation in cotton mills throughout the United States 24,073,000 spindles. Today there are undoubtedly many more.

The great tribute of $1,000,000 a day which Europe pays to our Southern States is a witness of the interdependence of grower and manufacturer. This interdependence is illustrated also by the visit of our English friends to this country.

The ratio of increase in the consumption of cotton, and the enlarging scope of its uses foreshadow the immensity of the world's future requirements. It is imperative that manufacturers seek sources for an enlarged supply, and stimulate production over a wide area. In this way the danger of a short supply and I emphasize the danger of a shortage, for there is no substitute for cotton, may be minimized. In this way also violent fluctuations in the price of cotton may be avoided and greater stability established throughout the entire industry.

The development of the South shows that the grower and manufacturer should work in harmony. It is common knowledge that today the South is more prosperous than ever, and that this prosperity is largely due to the development of her cotton industry. It is common knowlege also that the cotton industry throughout the North has thrived and prospered. The intimate relationship established between northerner and southerner allied in the cotton industry has added to the welfare of both, yet during the past twenty years many of our northern manufacturers have feared that the development of the South was

a menace to northern interests. The North labored under the misapprehension that the development of the South would be at the expense of the North and that the wealth contributed to southern industries would not flow back to the North, according to the economic law which I have suggested. Northern business men saw at the outset the immediate flow of capital to the South, but it has taken time for them to realize its return.

Opposition to beneficial change and development is found in the history of all great industries.

Since the introduction of machinery the wage earner has fought and struggled against all devices substituting mechanical for manual labor, yet it is clear beyond the shadow of a doubt that they fought against that which has brought them higher wages, lower relative prices for their commodities, and many added comforts of life. The machine has returned good for evil to those who have opposed it.

In an enlightening pamphlet read last February before the Manchester Association of Engineers, Messrs. W. H. COOK and JOSEPH H. STUBBS show by a careful compilation of statistics that the material welfare of operatives in textile industries in England has improved steadily and in an ever increasing ratio from the year 1856 to the close of the year 1905. From my own observation and experience, I may say that a corresponding improvement, or perhaps even a greater improvement, has taken place in this country.

The wage earner, therefore, should welcome any mechanical contrivance which saves manual labor. There should be a community of interest between wage earners, inventors and machine builders, and they should all work in harmony.

No one great industry should attempt to thrive at the expense of another. No one branch of any great industry can justly demand that its interest or supposed interests shall be preferred at the loss of cost of another branch of that industry. No one locality or section of the country should attempt to profit at the loss or expense of another locality or section. There can be no economic gain in transferring benefits, if such exist, from one

class to another class, of producing beneficiaries. The greater relative prosperity that may exist in one industry than in others can only be secured from the prosperity of those others. Excessive relative gains can only be temporary, existing only during a process of readjustment. Furthermore, such excessive relative gains, are distributed ultimately among other industries, according to an economic law. The prosperity of one section or of one industry is, in a sense, the prosperity of all sections and of all allied industries. If we envy the profits of others and attempt to limit those profits in order to divert the flow of capital toward our own industries, we impair the wealth of the world and ultimately our own industries in their just proportion. Create a great economy in your own industry and you reap the benefit directly. Create or assist in creating a great economy in an allied industry and you reap the benefit, but you reap it indirectly. Such, in my opinion, is the natural law in the industrial world, the economic law which causes in the end the distribution of the results of any particular prosperity among all classes.

President MACCOLL: In the city of Plymouth in old England there is a splendid monument to the memory of Sir FRANCIS DRAKE. It stands on the site of the bowling green where Sir FRANCIS, was playing a game of bowls when notice was brought to him that the Spanish Armada was in sight, and you will remember that he said he would finish his game of bowls and then attend to the Spanish Armada. The inscription on that monument particularly impressed me — one word, "DRAKE"; beautiful for its simplicity and its brevity, no need to say more, for everybody knew DRAKE and his story. And so in introducing the next speaker, to a gathering of cotton manufacturers there is need to say only one word, "DRAPER." General WILLIAM F. DRAPER.

REMARKS BY GENERAL WILLIAM F. DRAPER.

Mr. Chairman, gentlemen of the Commission and members of the National Association of Cotton Manufacturers: I do not know whether many of you gentlemen go to the theatre. I do not go nowadays as much as I used to, but the real point is, I don't know whether many of you went twenty or thirty years ago when I was more familiar with the various pieces that appeared on the stage. For fear that some of you were not old enough to go at that time, I will say that there was a farce which was quite frequently played and received with great applause, which was entitled "Too Much Johnson" [laughter.] It seems to me that our President had forgotten this when he called upon another member of the DRAPER family to make remarks.

My brother, the Lieutenant-Governor, has made you two fine speeches. One of them I know was good because your President says so; the other I know was excellent because I have listened to it myself. I was prevented by other engagements from attending the last session of the meeting today, and at the dinner I have learned that the Association has endorsed another DRAPER, by electing my son one of the Board of Directors. [Laughter and applause.] The last speaker, Mr. WHITMAN, has spoken of some of the productions which the DRAPER family have introduced. He did not say too much for them, to be sure, but at the same time it seemed to me as though it were rather piling up the agony. [Laughter.]

Now, gentlemen, I am a stand-patter, perhaps you know [laughter and applause] and believe in letting well enough alone. After those two good speeches of my brother and after the commendation of the product of our concern which has been given us by Mr. WHITMAN, I think it would have been far better if I had been allowed to keep my seat. However, I am on my feet and will do the best I can.

I am very glad to be here and to take part in the welcome to our distinguished guests, some of whom I have had the pleasure of meeting on the other side of the water. I have no doubt that they have found their visit to America interesting; I trust that they have found it profitable and I am sure that we shall all find it of great value if we are allowed to participate in the information which they are to communicate to the Association which has sent them here [laughter]. We Americans have the reputation of being a little too anxious as to what visitors from foreign countries say or think of us. We are a little too sensitive, in fact, it is said, to criticism. I hope, however, we are outgrowing that in industrial matters since our expansion of production is placing us further along the line of advance in comparison with foreign nations, and at any rate intelligent criticism is of value to any man or to any nation as pointing out the proper line for further advance.

I presume among the good things that our friends have seen in America they may have seen some things that they would not care to copy or to recommend others to copy. I am told that the principal object of the visit of this Commission has been to investigate the raising of cotton and the manner of preparing it for market. But I am also told that they have visited some of our cotton mills and that they are to do so more. I am sure that if they do so they will be greatly impressed with the march of improvement which has taken place in this line, a march which I think I am safe in saying has kept pace with American invention in other industries. Any mill that attempts to run its machinery just as it is without any idea of improving or cheapening its production is sure to go to the rear. In this fact lies the hope of our industry in the future. We should not be able to compete with other nations whose labor cost is less than ours, at least in the general markets of the world, if it were not for the inventiveness which the American people have shown. Three or four years ago I had the pleasure of lunching informally with the Emperor of Germany. During the lunch he was kind

enough to ask me many questions about our material progress and wound up with this question: "Why is it that Americans are so much more inventive than the people of any other nation in the world today?" I accepted the compliment, but said to him that perhaps I could not tell him what the reason was, but I would tell him what in my opinion was one of the reasons, and that, perhaps, you gentlemen may not all agree with. I said to him that I believed one of the important reasons was the high wages that we pay in this country as compared with the wages paid in competing countries. In the first place, these higher wages, everything else being equal, tend to develop a higher quality of man, and hence a more inventive man. In the second place, we make the production of anything in the mechanical line by hand work so expensive that we force the adoption of improved machinery in place of hand work and also in place of inferior mechanical processes. I also told him, something that I am well acquainted with, that our patent system in America was better than that in any other country in the world ["Hear! Hear!"], inducing invention by securing to the inventor a better protection for his own creation. The Emperor was kind enough to express his agreement with me in what I said on the question of labor, and I have learned since that several of the foreign countries are studying their patent systems with the view of giving increased protection to inventors.

As a matter of fact, gentlemen, as man is constituted no great development can come in this world without some necessity or some inducement that appeals to individual men. This is a fact that will be impressed upon us more fully than it is now if we follow the teachings of Socialism which are becoming so popular in certain quarters.

But I am wandering from my subject, gentlemen, and I have already spoken three or four minutes longer than I was told that I ought to do. I am very glad to greet the gentlemen present, I hope that they have enjoyed their sojourn among us and I wish them *bon voyage* on their return trip. [Applause.]

President MACCOLL. We are now ready to listen to the members of the Commission. They are all victims and it is for them to determine who is the first one. [Laughter and applause.]

Mr. H. W. MACALISTER. Gentlemen, I call upon Mr. GREG to respond [applause] as the first victim.

REMARKS OF MR. HENRY P. GREG.

Mr. President and Gentlemen: It is, indeed, a very hard post that Mr. MACALISTER has called upon me to fill. I feel that he is running away in a very dastardly fashion. [Laughter.] He has been appointed our chairman and it was understood, at any rate by me, that he should also be our spokesman. I do not think that a chairman has any right to delegate such important functions to any other person. But I must, having been called upon in this manner, express to you all a very deep gratitude for the extremely kind reception that we have received from everyone. Your secretary, Mr. WOODBURY, was kind enough to give us a most hearty welcome on our landing, and from that moment we have received nothing but kindness from everyone, from the President of this great republic downward. I am not quite sure whether I am right in in that remark and not quite certain whether I ought not to say from the President upward, [laughter] because I believe that here it is the proud boast of your President, if not to be the servant of all, at any rate to be of service to all, [applause] whether Republican or Democrat, whether white or colored. And certainly our reception by your President was of the most cordial description possible. We all realized at once from the way he received us the very strong hold that he has upon the affections of all Americans. He kindly told us that probably we should be able to get more information from Mr. Secretary WILSON than from anybody else, but that if there was anything lacking we must appeal to him and he would see that we were supplied with any information that we might require.

Well, gentlemen, we had a most notable trip. We, as I said, have received the most extraordinary kindness at every turn. But perhaps I may be able to convey some idea to you of that kindness when I tell you that we have been hauled free of

charge over 5,000 miles by your railways, and not only did they haul us free, but they took every step in their power to make our trip of use to us. And they did it this way: They knew who were the people most likely to give us the information we required, and they arranged that those people should join our car and travel with us for one or two or three hundred miles, so that we should have all the information we required without necessarily stopping at every place. I trust that we have appreciated and made good use of the opportunities that the railway companies have given us.

I am in an awkward position this evening, because it is impossible for me to make any report to you of the investigations that we have made. We have got to report to those who sent us, and I think that they would be very angry if we were to let the cat out of the bag this evening. And I think that if we were to do so they would probably say that if another commission was to come out they would not send the previous commissioners. And as this trip has been of most intense interest I should not like to run the risk of being barred from a future one. I think I may say that we have been enormously impressed with everything we have seen and perhaps with nothing more than what we saw in Texas. We have found out a great deal. In the first place, we have discovered that cotton is merely a weed, not worth cultivating. [Laughter.] We have heard of the steel king, the nitrate king, the copper king, and a great many other estimable persons; but we have actually met the carrot king. We found him in all his glory down in Texas. There we discovered that he was making three hundred dollars' clear profit per acre out of carrots. His only complaint was that instead of having five acres under carrots he had not five thousand acres under carrots. He told us that the demand from Chicago for his carrots could not be supplied at all; he was only able to send them one carload of carrots per week and Chicago wanted two carloads of carrots per day. [Laughter.]

I wish I could describe to you the fertility of that wonderful

country. I believe that Texas alone could raise cotton sufficient for the world's demand for some years to come. We saw the cotton plants four or five inches out of the ground on land which had been absolutely uncultivated, unreclaimed, two months before. That land had been cleared and plowed and planted and the cotton was standing four and five inches high, all within two months. Now I doubt very much whether that could be done in any other part even of this wonderful and fertile country. We were impressed beyond words with the possibilities of Texas. We came to the conclusion that if you wanted to just get along on a mere pittance you should grow cotton in Texas; if you were a little bit more ambitious your attention should be given to carrots [laughter]; if that did not satisfy you there were still onions; but if you wanted to become a millionaire in less than no time you must cultivate cauliflower.

Why I say this is really because I should like very much indeed to persuade the spinners of New England to commence a cotton plantation on their own account. I think that it would be a most instructive and valuable thing if these New England spinners were to purchase a plantation of say ten thousand acres and cultivate their own cotton, and I say that for these reasons. In the first place, you would then have a definite idea of what the cost of raising cotton was. If you found it very much more profitable to raise cotton than to spin yarn you would be able to divert your surplus millions and your surplus energy in growing cotton instead of increasing the spindleage, which would act in this most useful way: it would increase the amount of cotton and you would then be able to increase your spindleage. But there is no use whatever in increasing your spindleage unless you have the cotton to use when those spindles are in the mill.

Then, in the next place, you would be able to have a plantation run on model lines. You would be able to show the planters throughout the cotton belt how very easy it is to grow a bale to the acre. At present, I suppose throughout the cotton

belt the average is about a third of a bale to the acre. There is no reason, as far as we have been able to see, why you should not grow one bale to the acre, or on the present acreage, a crop of 30,000,000 bales. And I think that if you had such a plantation and were to show people how easy it was to grow at least one bale to the acre, you would find a great number of imitators.

Then I think, that you would be able to go in for a scientific method of seed selection. You would be able to find out what was the best seed for each locality, and I am quite certain that the planters throughout the cotton belt would very soon be most eager purchasers of your cotton seed. Further, you would be able to have under your own control the ginning and the baling of cotton; that is to say, you would be able to show all the planters in what form it was most suitable that cotton should be ginned and baled. This phase of the question has been most ably handled by your President and I only say these words with the desire to underline what he has said.

Further, I might say one word about the cost of such an experiment. I do not think it would be beyond the purses of the New England spinners and manufacturers. I think that an area of something like 10,000 acres with the accompanying ginning and baling plant could be arranged with a capital of something like $75,000. The expense of such an experiment I do not believe to be great. The only difficulty that you might have would be in the selection of a competent man to run such a plantation. But I have no hesitation in saying that New England has faced so many difficulties and has overcome them so magnificently that she would have no difficulty in very soon finding a suitable man as manager for such a plantation.

Now I must not take up your time. I only wish that I could adequately express our gratitude to everybody and for all the kindnesses they have shown us. Some, perhaps, may have thought that we have criticised matters a little bit too keenly and perhaps some may have thought that those criticisms were not entirely justifiable. But I can only say that good intentions sometimes go astray. You know the story of the groom who

one night went and roused up the veterinary surgeon and said that his horse was very bad. The surgeon said that he was sorry, but he was not going to turn out that night — he would see the horse in the morning. The groom said that wouldn't do at all, so the veterinary said, "If you will take this ball to the horse and give it to him, the horse will probably be all right." And so the groom said, "But I don't understand giving the horse a ball at all." He said, "Oh, it is very simple; all you have got to do is to take this ball and take a tube and put the ball at the bottom of the tube and blow the ball into the horse's mouth." So the groom took the ball and the tube and went back to doctor the horse himself. A few hours afterwards the veterinary surgeon was roused up again and he said, "Whatever on the face of the earth is the matter now? Is the horse dead?" The groom said, "No, the horse is all right." "Well," what have you come here for?" "Well," said the groom, "it is this way: I put the tube in the horse's mouth and I put the ball at the bottom of the tube, but the horse blew first and I got the ball." [Great laughter and applause.]

President MACCOLL. Mr. MACALISTER is now toastmaster.

Mr. H. W. MACALISTER. Perhaps Mr. ORR would be kind enough to become the second victim. [Applause.]

REMARKS OF MR. W. J. ORR.

Mr. President and Gentlemen : It is very difficult for me to follow Mr. GREG. I think he has covered the ground fairly well and, as he has said, some one might be angry with us if we told too much, so that I also must be careful because I think I have enjoyed the trip equally with Mr. GREG. All the speakers I have noticed, have extended a welcome to us over here. I may say, gentlemen, that we are getting quite used to this; everybody without exception has been so kind to us that we really are becoming quite accustomed to it. What we shall feel like when we get back to England I really don't know. Your Lieutenant-Governor said that he was afraid our leg had been pulled. Well, gentlemen, that may be so. Perhaps if I were to state more of the facts that have been given us you would agree with him, but on the other hand we find there are always two sides to a question. For instance, we came across one gentleman who was anxious to sell to us for cotton cultivation in Texas one million acres of land, or sky, we didn't know which, and he informed us with every surety that cotton could be raised at 2½ cents a pound. Well, certainly that sounds like having our leg pulled. But still on the other hand, we have heard from gentlemen who were perhaps afraid of us accepting this offer of sky and putting a million acres of it under cultivation in cotton. These gentlemen on the other hand informed us very seriously that the price of raising cotton was at least fifteen cents [laughter]. Gentlemen, so far as we can learn, we think that if we put these two figures together and divide them by two, the leg will be about in the right place [laughter].

Of course, as spinners we are all most anxious to have plenty of cotton to keep our mills running, and we think that if methods are employed such as have been shown to us and with results such as we have heard of, — we hope they are not pulling our

leg in this direction — we think cotton can be grown certainly under ten cents a pound, and we consider that if cotton can be grown under ten cents a pound it will prove a mutual benefit not only to the spinners of the world but also to everybody in the world. It will increase the demand for the production of cotton from the United States, because in the United States alone can cotton be grown on a cheap basis if it is to be grown cheaper than at present. And if this can be done I am sure everybody will agree that the demand for cotton goods and the uses to which cotton would be put would be greatly increased. A few cents a pound or a few cents on a piece of calico is something very much greater to the natives of India and China than it is to the growers of cotton. The price of cloth is not raised proportionately to the price of cotton, because in the handling of this cotton where capital is employed the interest and the profit on all this capital brings up the relative increase in the goods to an enormous extent. And if this were worked out on the basis of a 15-cent cotton and a 9-cent cotton it would be found that a 10-pound sheeting in China would be increased to the extent of about 26 cents over and above the proportionate cost of the raw material. Gentlemen, this seems a pretty serious item when you consider what 26 cents is to a native of India. And the reason, I think, that we all wish cheaper cotton to be grown is — that the increase of the manufactured goods may be stimulated.

I do not think it is any use saying anything further of our trip. Mr. GREG, I think, has said as much as (perhaps I may say) policy on our part would allow. But I hope that when we get back and when we have given our report you may be able in return for your kindness to us over here to have the full benefit of our experience in America. I thank you, gentlemen. [Applause.]

REMARKS OF MR. H. W. MACALISTER.

Mr. President, Lieutenant-Governor Draper and Gentlemen:

I must, perhaps, apologize in the first place for calling upon my associate commissioners to speak in place of myself. As I have done the most of the talking in the places we have visited, it is only fair that on an occasion of this kind my colleagues should have the first turn. As my friends have spoken on the general topics I just want to say a word or two on the economic part of the subject which your friend Mr. WHITMAN referred to. The wide area over which his remarks extended is too great for me to deal with on an occasion of this kind, so that I shall confine myself to a single subject.

In the first place, with regard to the growth of cotton being dependent on the growth of other industries. As Mr. WHITMAN remarked, all industries are dependent on each other, and I think with his general remarks we are all agreed. As to the general use of cotton, we find in England the cheaper we make the article the more we want of it, because the uses to which it is put are every day extending to other industries. We mix cotton with silk, with linen, with wool, with flax, with almost every other fibre which is known to the human race, and new businesses are continually arising. My friend on my right (Mr. GEORGE A. AYER) has been telling me tonight of a business in which he is interested, viz: yarns and cloth for the manufacture of motor tires, which is quite a new outlet. That appears to be a direction in which not a small quantity of cotton is likely to be used, because the increase of the machines is going on every day and we do not know where it is likely to end.

Mr. WHITMAN spoke of our skill in fine spinning. He mentioned an extraordinary count which had been experimentally produced but he also spoke of another count as No. 220s which

he had heard of as being spun over here. It was only a week or two before I left England that I met a gentleman on the Exchange who said to me, "I have just heard of the sale of a lot of cotton yarn at about 125 shillings per pound." The fact was that a sale had been made that day of 100 pounds weight of 400s/2 at about $30 a pound. That gives you an idea, gentlemen, to what practical fineness we can spin cotton in England. This yarn was made out of your own cotton, I believe, "Sea Island" and the ultimate end of that valuable material was to be sent to Berlin to be manufactured into that beautiful lace which you are so fond of buying when you go over there.

Now, gentlemen, with regard to the development of English skill in the manufacture of machines. One of the gentlemen referred to the inventor WATT. It may be interesting to you to know that quite close to the manufacturing town of Oldham we still have an original WATT engine. I think it was the same WATT who had an engineering establishment in the town of Aston-under-Lyne. There is a story told of that WATT that he was standing at the door of his factory one day and a man came along and applied for work. Mr. WATT asked, "What can you do?" "I am a turner," the man replied. "Well," Mr. WATT said "I haven't any work for you. My place is full." And the man was turning to go away when Mr. WATT noticed the peculiar hat he was wearing and, calling him back, asked, "Where did you get that hat?" [Laughter.] The man said, "I made it." Mr. WATT asked, "How did you make it?" "Oh," he said, "I just put it in the lathe and I made it." "Yes," said Mr. WATT, "but how did you make it?" "Oh," he said, "I just made the machine dae it." He was a Scotchman, as it happened, and I happen to be a Scotchman myself, so perhaps you will excuse the reference. Needless to say, the man was employed by WATT. He had invented, without taking out a patent for it, the "overhead action" by which you can turn an ellipse instead of a round form.

The old engine which I have mentioned is still standing as a landmark, overgrown with ivy, in a valley near Park Bridge,

and you can there see the ends of the beam fitted in the old fashioned way of getting over the difficulty to which we now apply radius rods. I dare say you remember that in the first engines which were invented, in order to get over the divergence of the centre of the end of the beam from the centre of the cylinder, they made use of chains over a segment of a circle, now replaced by our modern method of radius rods. This is but one of many illustrations of how small beginnings in invention end in a modern complex machine.

It continually occurred to us during our visit to the South that you have there a ripe ground upon which to bring to bear economical improvements as applied to, not only the agricultural machinery which you employ, but also the methods of dealing with the people. We, as a Commission, were particularly impressed with the position in which the so-called renting farmer stands as compared with the man who exploits him.

With reference to your great country. We have been struck with the advantages that you, as a nation, have over our old country, England. In the first place, you have great agricultural advantages in your many varying climates, from the cold of the North to the wonderfully productive climate in southern Texas to which Mr. GREG has referred and of which I need not further make mention with regard to the product of vegetables. But this was remarkable and made a great impression upon our minds, the return which the grower of these various products received, in many cases the value of one year's crop being very much larger than that of the land itself.

Mr. WHITMAN has spoken of your great natural advantage in coal. It was pointed out to me, however, only a few weeks before I left England, that the United States was not likely to have a monopoly in that commodity. Speaking from memory, and I would not like these figures to be quoted as strictly accurate, the gentleman who mentioned it to me said that it was estimated that in the United States there was something like 68,000 million tons of coal as yet unexploited, but in that one province in China there is something like 1,200,000 millons tons unexploited.

Referring to your present cotton-growing area, about six months ago, as a meeting of the British Cotton-Growing Association, held at Manchester, it was stated that only about 130 years since six bales of American cotton were landed in the port of Liverpool and that the custom house seized those six bales on the ground that it was impossible that so much cotton could come from America. Mr. WHITMAN, I think, has pointed out that our first imports of cotton came from our colonies in the West Indies.

In 1870, to give you a short reminiscence of my own, the American crop was about three millions of bales. In 1874 it was about three and a half millions. I remember very well the first four million bale crop of cotton. People said that they could not possibly use it all up. But in 1886, when for the second time I visited the United States, I went as far South as Charlotte and found there that the first cotton mill had just been built, containing about 5,000 spindles. In that year seven million bales were grown. When I went back to England my friends asked me what I thought of America's capacity for growing cotton. I replied that in my short travels I had seen more land uncultivated than cultivated, and that to my mind the possibilities of America as a cotton-gowing area were not seven million but seventy million bales.

In 1897 you grew 11¼ millions. In 1904 you grew fourteen million bales or thereabouts.

I have been greatly impressed with one thing in connection with your government — the interest that it takes in the education of your people. In our travels around the Southern States we have met three or four government experts traveling in the country whose business it was to give information to the farmers, and the government has arrangements with farmers in different parts of your country by which they can utilize plots of ground experimentally in which specifically selected seeds are planted to ascertain their growth and productive results in the respective soils and climates. South of Houston, I think it was near Kingsville or Kennedy, we visited a large ranch. The manager told

us that in 1904 he had three hundred acres of land under cotton; in 1905 he had 1,800 acres and in the coming season he said that he had determined to put in 4,000 acres. In the garden surrounding his house we saw a lemon tree the fruit from which at your 1904 exhibition in St. Louis had taken a first prize. Upon another estate we found that 11 acres were under cotton last year, but this year 1,500 acres had been planted; so you see that south of Houston the growth of the staple appears to be on the increase.

Now with regard to the government and its methods of distributing information amongst the people. I felt very jealous of your advantages in this respect over our little country of England. We have not as yet even a Minister of Agriculture. Our farmers are practically left to themselves to find out how best to cultivate their land. But your government is more paternal. You send your experts amongst your farmers; you tell them what is the best food to supply to their various soils and crops; you instruct them as to the best seeds to purchase and the proper rotation of crops to replenish the soil chemically. Dr. KNAPP appears to me to be doing valiant service among the people not only for their individual benefit as farmers, but also for the benefit of your country at large.

The southern portion of the state of Texas I must refer to particularly as having a great natural advantage, viz: that it can grow a crop of cotton and then get a second crop of another vegetable planted in October or November and taken out of the ground in the following February. As Dr. KNAPP pointed out, instead of allowing the land to lie fallow as it does in the more northern climates after a growth of cotton for two or three months before plowing and planting for the succeeding crop, this section of the state can keep the land under cultivation and also secure a second crop.

General DRAPER made a remark with regard to your countrymen being somewhat sensitive to criticism. Now, gentlemen, when we arrived here our great difficulty was to avoid people who wanted to see us. An Englishman, I dare say you have

found out, is somewhat of a retiring animal; he does not appreciate too much attention; he does not like to be asked questions, and therefore I felt a little difficulty in agreeing with General DRAPER as to the supersensitiveness of Americans. And further, my experience has been that if an Englishman wished to see an American's factory, as a general rule he is received with open arms, and under those circumstances I certainly feel that Americans to that extent are very much more free and open than my countrymen. If you ask an Englishman to let you into his factory he looks at you very hard and wonders what you want. The American says to himself, "If we let this gentleman into the factory he will criticise us and we will get something out of him." [Laughter.] The Englishman thinks the other way around and suspects that the American wants to find out something, and he says, "No, I had rather you wouldn't come into my factory." But I am beginning to feel that the American is right and the Englishman is wrong.

Now, gentlemen, in closing, I must add to the remarks of some of my colleagues with reference to your kindness to us since we came into this country. We very highly appreciate your warm welcome; it could not have been warmer. We have been overwhelmed with kindness wherever we have been and we appreciate it more than I can tell you.

I will now call upon my friend Mr. BARLOW to make a few remarks. [Applause.]

REMARKS OF MR. THOMAS D. BARLOW.

Mr. President and Gentlemen: I think this is very unfair, Mr. MACALISTER, and if it were not for appearances and that you gentlemen might think we were not docile members of this Commission, I don't think I should obey. My position reminds me in the results which he anticipated of an incident which I once heard of an eminent American, General PORTER, who was, I believe as distinguished in the arts of after dinner speaking as in those of war. On this occasion, the Chairman of the dinner at which he was present, in referring to him remarked that General PORTER always reminded him of a penny in the slot machine, you put in a dinner and out came a speech. General PORTER, not altogether gratified by this somewhat crude reminder of what was expected of him remarked in reply that he could return the compliment, for the Chairman put in a speech and out came your dinner. [Laughter.] I am not at all sure that that may not very easily happen tonight, and if any gentlemen feel any symptoms coming on, I hope they will have the kindness to tell me beforehand.

I do not know that there is anything left for me to say. We have heard from Mr. WHITMAN of the wonderful development of America, and we have heard from his Honor, the Lieutenant-Governor what will be the probable result of that development to us. We have travelled through the South in a manner in which the Olympic gods, if they had been alive, could not have excelled. We have seen so many wonders that it is impossible to enumerate them all here. We have travelled in a car of magnificence unequaled in Europe, I am quite sure. We have been shown lands which were reported to have produced five bales of cotton to the acre. We have been shown lands which were reported to have produced a $300 profit per acre on car-

rots. The Lieutenant-Governor has suggested that much of our information should be taken *cum grano*. I dare say that is true. It must be admitted that there was a good deal of conflict in the various statements which we heard. But I am sure that it is pedantic to bother about such trifles. Consider the pleasure which it gave us to view the land which produced five bales of cotton, and $300 worth of carrots. It did the man no harm if we believed it, and it gave us immense pleasure. We should not have had anything like the same pleasure if he had told us it only produced a beggarly bale; we should not have remembered it at all. I am sure we do not feel grieved about that.

We visited a cotton mill and we were shown a man in the mill whom I think we might take as a type of the advancement of the South. Several months ago, this man had entered the mill as a raw hand, who had never seen cotton being spun or woven before. He was put on a Northrop loom and after a short time he was seen violently running to the manager and informing him that something dreadful was happening for all the strings were running off the log at the back of the machine and he did not know what was going to happen. That was only a few months ago, and now the man is, I believe, earning about ten dollars a week. It seems to me that that sort of thing is typical of the advance of the South, in recent years. With Mr. TOMPKINS before me, I should not dare express any views upon cotton growing, for I know what an authority he is. We did not, however, show any such reticence in our travels, and I think that the way in which everybody received our remarks was extraordinary. Whenever we alighted, whether to ascribe it to the Railroad Company or to the presence of Mr. MACCOLL, who presided over us like some guardian angel, I do not know; but wherever we were, instantaneously there appeared a bevy of genial and most hospitable gentlemen, who hailed us to cotton exchanges, cigars and novel but most appetizing drinks. [Laughter.] We plied them with questions, we thrust notebooks under their very noses and wrote down everything they

said with vigor and solemnity. We informed them that we thought there was great room for improvement in the South, that cotton as regards cultivation, was frequently bad, as regards ginning, simply pernicious and that as regards baling, well, I cannot tell you what we said about baling. We have talked so much about bales, that the other night I had a nightmare. I thought I was a bale. When I got up in the morning, I felt to see whether I had seven bands and was an American bale, or had eleven bands and was an Egyptian bale. [Laughter.]

Well, I cannot think of anything more to say. I can only echo what my friends have said. We began in a blaze of glory at Boston and we end there with equal magnificence. It has certainly been one of the happiest experiences in my life, and I expect in theirs also. None of them seem to have made what seems to me the obvious suggestion, and as I believe I am the last speaker, it seems to be left for me. I think you ought to send us a commission. [Hear! Hear!] Where we have had to go about, so to speak, with a telescope, you would have to go about with a microscope and you would find it very hard indeed to travel 5,000 miles. [Laughter.] In London there is a railway which is called the "Inner Circle"; it goes round and round underground. A very stout lady was once traveling on this railway. In fact, she was so stout that it was quite impossible for her to get out of the carriage in the ordinary way. Her motions were extremely deliberate and an officious porter seeing her alighting back foremost from the train, imagined that she was getting in, so every time he shut the door and pushed her in, "All right, lady, All right," and so the poor unfortunate lady never got out at all, but travelled round and round the "Inner Circle". Well, I think you would have to do that, too. Still, all the same, you might find something which would amuse you. I don't know if you could learn anything, I am quite sure you could teach us many things. Our criticism of your bale have been as adverse as they have been numerous. We have not got a bale, we have not got a gin, but we have plenty of other things and I am quite sure you would find something

about which you could make equally unpleasant remarks. Therefore, I hope you will let that be an inducement to come, for in so doing, you will give us a chance of returning your hospitality. And though we shall find it very hard to do that adequately, it will be a most inestimable delight. Gentlemen, I feel it the greatest pleasure to thank you all. [Applause].

President MACCOLL. There has been so much said about the South that it seems to me it would be unfair and incomplete, not to have a word or two from a distinguished Southerner who is here this evening, Mr. DANIEL A. TOMPKINS of Charlotte, N. C. [Applause.]

REMARKS OF MR. DANIEL A. TOMPKINS.

Mr. President and Gentlemen : I know all about Mr. GREG'S carrot story and I just want to say to you gentlemen in New England here that you have not been told but about ten per cent. of the real facts in the South. We didn't want to give them any more than they could take in at one time [laughter]. As a matter of fact, that fellow in Texas raised $3,000 worth of carrots on an acre. He is going to tell it to them ten per cent. at a time.

I am one who believes that we are at the beginning of a new era in the production of cotton and that we people in the South as well as the rest of the world are going to prosper. It is impossible that the progressive spirit of England and of New England should be brought to our aid without accomplishing results that none of us have heretofore thought of. We in the South feel that in the past thirty or forty years we have maintained the production of cotton, at the same time we have had to fight for the preservation of the Anglo-Saxon civilization, or in other words, we have raised the production of cotton to ten and twelve millon bales under most adverse influences and without much advice, counsel or help from our brethren in the northern part of the United States or in England [applause]. I may say to these gentlemen from England, that whatever criticisms they put upon the production of cotton in the South, is put upon Englishmen, because it is that one part of the United States in which there is yet the most unchanged English blood that there is in the United States, and we do not mind your criticism, because in a way we claim to be English just as much as you are. [Cries of Hear! Hear! from the English visitors.]

Now, if we can get where we have full co-operation, we ourselves being freed from the political troubles which we used to have, which had no relation to cotton except to hinder its

growth, being freed from that hindering influence, if we can in addition get the co-operative help of New England and England, we will bring the production of cotton in the South to a bale to every acre. Nobody has need to come to show that two bales of cotton can be produced to the acre or that one bale can; it is already done. I do not know an instance in which I myself could verify the statement that five bales have been produced on an acre, but I can verify the statement that a gentleman who was in a college with me has raised four bales on an acre and he expected to increase it if he had lived.

I appreciate very much the compliments that have been paid the United States government and the State governments in the South in having developed farming interests on lines on which they may be best developed. In other respects, we have already laid the foundation for greater improvement by the establishment of agricultural departments by the conduct of experiment stations, by the establishment of agricultural colleges, and I believe that more attention has been given to laying the foundation for cotton production in the South than to any other agricultural product in the world. It is a seed that has been planted that must be given time to flower and fruit but the tree is at the present time certainly in a healthful condition. And the cultivation and the opportunities for the development of it toward the condition of flower and fruiting has more promise in it today than it ever had before in the history of cotton production in the world.

I participate in my feelings of hospitality towards the gentlemen. In the South we were not able to give them anything like that you are giving them here, but the spirit of hospitality was none the less there as it is here. [Hear! Hear!] These movements not only will help to bring about a production of better cotton but will bring about a better understanding of all the English and American people. [Applause.]

President MACCOLL. Two cards have been handed to me. I wish to say to Mr. GREG that one of them states that $75,000

to start a plantation has already been raised at one of these small cross tables, provided he will take the management of the company. [Laughter.] The other card calls attention to a famous club that exists in Rhode Island, called Squantum. Every American knows it; it has a national reputation. One of my fellow-members in that club is extremely anxious to have our English friends come down there within the next day or two. If I remember correctly there is to be a planked shad lunch there on Saturday at one o'clock. I know that we have already induced these gentlemen to sample every imaginable kind of drink and nearly every American dish that is known, but I think planked shad has been omitted. Perhaps Colonel CHILD has a word to say on this subject.

Mr. CHARLES H. CHILD. I wish to say that we would like a day or two longer to prepare that dinner if possible, and have it on Tuesday or Wednesday of next week.

President MACCOLL. Our English friends are going to Washington Saturday evening.

Mr. CHARLES H. CHILD. Well, we can have it on Saturday if they can come.

Mr. DANIEL A. TOMPKINS. If they do they will never get to Washington. [Great laughter.]

Mr. CHARLES H. CHILD. I shall have to leave at four o'clock Saturday for Boston for a dinner, but I shall be there until that time. You can do the rest.

President MACCOLL. I will interview them after we adjourn tonight.

Mr. CHARLES H. CHILD. We shall want General DRAPER and the Lieutenant-Governor and yourself to be there.

President MACCOLL. I would like to ask the Secretary a question: *What is the time?*

REMARKS OF MR. C. J. H. WOODBURY.

Mr. President: I do not know what time it is and moreover I do not care, for in this congenial company attention is concentrated upon the friendly relationship of those present. To my mind the only way to ascertain the time is by the beautiful testimonial which was given to me by this Association a year ago. That clock has continued to mark the flight of the passing year with a continuation of delightful remembrances of one of the most pleasant experiences of life, as each quarter of an hour it harmoniously chimes the time.

Highly as I appreciate the cordial inscription on the golden plate which decorates the dial, the sentiments which accompany the gift have imbued my life with such a degree of happiness that it appears that the clock must also bear the motto of the the old sun dials: "I mark the hours of sunshine."

During this year the membership of this Association has continued to increase in a most gratifying manner by those who have at heart the interests which it represents. The number of new members has been so great that my difficulty in recognizing those whom I have not met before, although I have seen their names on the proposition of membership, has imposed on me quandaries similar to that of General SHERMAN who had some underwear made at Haberdasher's in Washington, and a few days later while walking along Pennsylvania avenue with an officer just back from the Indian frontier, the man who had taken measurements came along and looked up with a frozen grin, and the General shook his hand warmly and told him that he "looked stubbed as ever," and asked very cordially how he had been since they had last met, and the man replied that he had been very well; and then the General said, "Why, your name has escaped me," and the man replied, "Why, I made your shirts!" "O, yes, yes. General DOUGLAS permit me to introduce to you my old friend, Major SCHURZ."

Our friends from over the sea have doubtless obtained a vast amount of information relative to the raising of cotton during their long trip through the cotton belt, but those in the Northern mills have been obtaining information on the subject for many years.

When our late member, GILBERT P. WHITMAN, was Agent of the Annisquam Mills the purchasing officer of his corporation bought a lot of very poor cotton which was probably storehouse sweepings, and better suited for manufacture of waste than of goods. A short time after he called at the mills and asked how he liked the cotton. Mr. WHITMAN asked if he was going to send down any more, "Why, yes, I can buy a lot more and get it very cheap. How much do you want?" "Oh, I was not asking for any, but if any more is to be sent out I would suggest that they mix a few crows' nests with it." "Crows' nests! What do you mean sir?" "Why, I mean that it would increase the quantity without deteriorating the quality.*

The enlarged character of the scope of this Association which has been indicated by the action of this meeting will entail upon the organization greater work as well as greater usefulness, and this extension also indicates the necessity of more extended resources. This can only be obtained by the continued increase of membership, because it cannot be thoroughly representative of the interests as long as desirable people are not affiliated as members.

But, however large the scope of an organization in its extent, its initiative of application depends upon the living human unit. The administration of the largest mill receives its inspiration from the brain of the manager, the fabrication of the stock in process results from the faithful work of individual human beings, and furthermore, at the uttermost extreme of the application of the product it applies to the comfort, the taste and

* In comment on the above, one of the guests at the dinner was reported to have stated that he did not understand how a man qualified to be a manager of a mill could have made such a suggestion, for he must have known that such non-fibrous material as crows' nests would be absolutely unsuited for spinning and must be removed before the preliminary processes of manufacture could be begun.

welfare of the human beings who wear the cloth; and it is from this scope, from man to man that the work of the great industry which this Association represents must continue to be discharged on this basis of commercial equities which are measured from the cost of the finished goods to the receipts of the final product.

President MACCOLL. We are to close promptly at eleven o'clock and we have just five minutes in which to hear from Mr. T. H. RENNIE of South Carolina. [Applause.]

REMARKS OF MR. T. H. RENNIE.

Mr. President and Gentlemen: It is an unexpected pleasure because this is the first announcement that Mr. RENNIE has had that he would have anything to say at this meeting. The pleasure is none the less great because we have listened very quietly, we fellows from the South, to all sorts of remarks on how cheap cotton can be raised. Gentlemen, I have been South nearly twenty-five years; I have seen cotton raised under all sorts of conditions. I sat here tonight and I stand here now and I see gentlemen with dress suits on, some of them wearing lawn ties that are so cheap that they never wear them but once. Some of them wear collars made of cotton that they buy three for a quarter and they never have them laundered — they throw them away. There are gentlemen here wearing cotton socks that never go to the laundry; they are worn and thrown away; they are too cheap to be washed. We heard in President MACCOLL'S speech how cheap cotton could be raised, and without being discourteous we have with us tonight a delegation from England trying to find out how cheap cotton can be raised — why? For three years the English government, with the assistance of the English spinners, have been trying to raise cotton, and the cotton they have raised, gentlemen, has cost them twenty cents a pound. Now, they want to know why they cannot raise it for five cents, and they have been South to find out.

I don't want to be discourteous, but I want to say, gentlemen, I would like to have you see the other side of the picture. Have you ever been South? General DRAPER has, the Lieutenant Governor has, Mr. MACCOLL has. Have you seen that old lady with the hoe, in the faded print calico wrapper, without any underclothes, hoeing the cotton? Have you seen the children that never had any shoes or stockings in the winter time? Why? Because cotton is so cheap, it costs so little to

raise it, it brought so little in the market that they could not have any more clothing to wear.

The South has woke up to this fact that cotton must be had, — that it is necessary for the economic conditions of the world that we have cotton. We all use cotton. We use it in so many ways that, unless we stop to think, we cannot begin to tell the many uses we put cotton to. The South has woke up. The cotton planter has been a serf for many years; the cotton planter has been a servant to the civilized world ever since the first bale of cotton was raised. That time has passed. The South is not going to raise any more five-cent cotton; it is not going to raise any more six-cent cotton. I am a cotton manufacturer, I have been in the cotton business for forty years — I don't look it — and the question that comes up to me is, as Americans, as men sitting here eating and drinking and having a good time, should we conserve American ideas and American principles, should we live for the star of empire, or should we look backward? You can all take your choice, but let us not figure how cheap we can get cotton. Let us figure whether we will live and let live. Let us see if the Southern planter is due the same consideration as the New England spinner. If he is, give him a chance. I look at your streets, your institutions of learning. I was at the Institute of Technology two days, and I take off my hat to that sort of thing. I was born and bred in New England and I love it as I love my wife, and I adore it as I adore my daughter. But, gentlemen, let us get broad enough to let the Southland of ours have the same streets, the same beautiful buildings, the church spires pointing the way upward, the institutions of learning that shall capitalize our brains in the South as well as in New England. Let us all get together and say, "No section can prosper unless we prosper all together." Let us be true to the motto, "United we stand, divided we fall." We don't want five-cent cotton. We do not need it in our business. What we want is stability. What we desire is a known quantity, and a stable price. It is in your hands, and, God bless you, I don't believe there is a man here who is not going to say that that old

calico gown has got to go, and that woman shall have shoes and stockings and underwear, and she shall be a respectable member of society, because the New England spinner is going to see that she gets a fair price for her labor. [Applause.]

Mr. HENRY P. GREG. Mr. President, may I just remove what might be a false impression, and that is that we, as a Commission, have nothing whatever to do with the British Cotton Growing Association, but are absolutely independent of it.

Mr. H. W. MACALISTER. Gentlemen, Mr. GREG should add, "nor the government of England." I think the last speaker referred to the government.

President MACCOLL. The meeting is adjourned.

APPENDIX.

THE CONFERENCE OF GROWERS AND MANUFACTURERS OF COTTON.

In accordance with the following resolution adopted at the meeting of the Association held in Atlantic City, which was the first initial record on the subject:

Resolved, That the Board of Government be authorized to invite delegates from the International Federation of Master Cotton Spinners' and Manufacturers' Associations to attend our 80th Convention, to be held in Boston, in April, 1906, and also to confer with The Southern Cotton Association and with other manufacturing associations regarding the advisability of holding, about the same time, a joint conference of representatives of the manufacturing and cotton growing interests of America and Europe.

A preliminary meeting of representatives of the New England Cotton Manufacturers' Association, The American Cotton Manufacturers' Association, The Southern Cotton Association, and The National Ginners' Association was held at the hall of the American Society of Mechanical Engineers, New York City, January 24, 1906, at which the proposition received favorable consideration and measures were taken to provide for the meeting to be held at the New Willard Hotel, Washington, D. C., May 1 and 2, 1906.

The record of the Proceedings of this Washington Meeting form a book in typewriter which is in the library of this Association.

This meeting was attended by delegates from The New England Cotton Manufacturers' Association, The American Cotton Manufacturers' Association, The Southern Cotton Association, The Farmers' Educational and Co-operative Union, The National Association of Manufacturers, The National Ginners' Association, The International Federation of Master Cotton Spinners' and Manufacturers' Associations, government officials, and others interested in the subject of cotton, the whole number in attendance being seventy-five.

The following officers were chosen: *President*, JAMES R. MACCOLL; *First Vice-President*, HARVIE JORDAN; *Second Vice-President*, R. M. MILLER; *Third Vice-President*, H. W. MACALISTER; *Secretaries*, RICHARD CHEATHAM, C. J. H. WOODBURY, C. B. BRYANT.

The two days were occupied in a very full and free discussion of subjects pertaining to the growing and marketing, and to some extent, the manufacture of cotton.

The following resolutions were adopted:

Resolved, That it is the sense of this meeting that the government statistical cotton year be changed to run from August 1 to August 1, instead of September 1 to September 1, as at present.

Resolved, That a committee consisting of one delegate from each organization represented in this Conference be appointed by the president of each organization to confer with the Secretary of Agriculture, looking to the adoption by the Department of the resolution adopted by this body as to the changing of the cotton year.

Resolved, That it is the sense of this body that speculation in cotton futures is disastrous alike to grower and spinner, and that we will use our personal and organized effort to eliminate this evil from this great commercial commodity.

REPORT OF COMMITTEE ON BALING, GINNING AND HANDLING AMERICAN COTTON.

We, your committee, recommend as follows:

1. That all bales be made of standard dimensions.

2. That light weight new burlap be used for bagging, or if conditions justify, that cotton canvas be used.

3. That ten ties be used on all bales, with the Egyptian style of buckle preferred.

4. That all cotton should be bought and sold net weights.

5. That a committee be appointed whose duty it shall be to have cotton baled as above, and to submit same for practical test to consumers. That this committee shall have power to investigate and report on the various new methods of ginning and baling generally. This committee to report at a future session of the Conference.

C. H. FISH,
DANIEL A. TOMPKINS,
S. A. WITHERSPOON,
J. A. TAYLOR,
H. W. MACALISTER,
H. P. HUDSON,
S. A. KNIGHT.

INDEX.

A

Active Members 15
Adams, Henry Shaw, Recipient of Student's Medal 100
Advertisements, Receipts for . . 111
Aiken, Joseph D., Member Committee on Nominations . . . 93
Amendments to Constitution . 86
Amendments to Charter 4
Amendment to Constitution Proposed 100
American Telephone and Telegraph Company, Resolution of Thanks to 175
Amory, Charles B., Delegate to Conference of Cotton Growers and Manufacturers 174
Appalachian Forest Reserves, Resolution on 114
Armitage, Joseph D., Elected Active Member 152
Art Club, Exhibition at 92
Association Medal 99
Association Medal, Committee's Report on 113
Associate Members 35
Atkinson, Edward, In Memoriam, 67
Atkinson, Edward, Member of Committee on Meeting . . . 88
Attendance at Eightieth Meeting 75
Auditor's Report, ... 109
Australian Wool Crop, ... 273
Automatic Stokers, Elwood E. Taylor 318
Ayer, George A., Chairman Committee on Resolutions . . 165
Ayer, George A., Nominated Vice President 173
Ayer, George A., Elected Vice President 176
Ayer, Nathaniel F., Member Committee on Meeting . . . 88

B

Baling, Tare on 248
Ball, Wallace L., Elected Active Member 153
Ballard, Joseph W., Elected Active Member 153
Ballot on Change of Name of Association 96
Ballot on Increase of Directors, . 98
Banquet to Lancashire Private Cotton Investigation Commission 330
Barlow, Thomas D., Address at Dinner to Lancashire Private Cotton Investigation Commission 367
Barnefield, Harold C., Elected Active Member 153

Beatty, Robert, Elected Director for two years 176
Beatty, Robert, Nominated Director for two years 173
Belt Creep, W. W. Bird 312
Belts, Effected by Humidity . . 180
Belt Slip, Formula for 314
Belt Tension, per Square Inch . 314
Belt Tightness 314
Bennett, Frank P., Jr., Cotton Prices and Wool Prices . . . 268
Bennett, Frank P., Jr., Resolution of Thanks to 175
Binns, John H., Elected Active Member 153
Bird, W. W., Belt Creep . . . 312
Bird, Prof. W. W., Resolution of Thanks to 175
Bird, John B., Elected Active Member 153
Bishop, Robert, Elected Active Member 153
Blair, William G., Firth Scholarship 100
Blanchard, Edward R., Elected Active Member 153
Blood, Robert, Elected Active Member 153
Board of Government 10
Borden, Norman E., Elected Active Member 153
Bowen, Charles A., Elected Associate Member 158
Boyd, John V., Elected Active Member 153
Bolton, John B., Elected Active Member 153
Brains, Capitalization of 116
Bremen, Textile Congress at . . 227
British Cotton Growing Association 136
British Weights and Measures Association 285
Burgess, Robert, Member Committee on Nominations . . . 93
Business Purpose, Unity of, Frederick P. Fish, ... 141
Bussey, Edward Henley, Recipient of Student's Medal, . . . 100

C

Call to Eightieth Meeting . . . 85
Capitalizing Brains, H. S. Pritchett 116
Carnegie, Andrew, Supremacy of Steel 345
Carrots, Prices of 355
Carrots, Profitable Cultivation of, 368
Carter, Stewart F., Elected Active Member 154
Cement, Durability of 293
Cement, Production of 291
Ceylon Cotton Growing 136
Chace, Arnold, B., Elected Active Member 154
Chace, Charles F., on Belt Creep, 317
Change of Name, ... 4
Change of Name of Association, Ballot for 94
Chart of Growth of Association, 105
Charter 3
Charter, Amendments to . . . 4
Child, Charles H., Invitation of to Dinner at the Squantum Club 373
Chinese Exclusion, Resolution on 171
Cobb, W. C., Elected Active Member 154
Committee on Association Medal 99
Committee on Meeting 88
Commonwealth, Welcome to, Eben S. Draper 121
Concrete, Reinforced, Applied to Factory Construction, Robert A. Cummings 290
Concrete, Reinforced, Formula for 298

Conference of Cotton Growers and Manufacturers, Delegates to 174
Conference of Growers and Manufacturers of Cotton 380
Congdon, William A., Elected Active Member 154
Constitution and By-Laws . . . 5
Constitution and By-Laws of International Federation 221
Construction, Concrete Formulæ for 298
Copeland, Robert A., Elected Active Member 154
Cost of Raising Cotton, Eben C. Willey 237
Cotton Bands Affected by Humidity 180
Cotton, Cost of 139
Cotton, Cost of Raising, Eben C. Willey 237
Cotton Crop, Increase in 125
Cotton Crop, Increase of 364
Cotton Cultivation, Texas . . . 364
Cotton Investigation Commission from Lancashire, Dinner to . 330
Cotton Prices and Wool Prices, Frank P. Bennett, Jr. 268
Cotton Production by United States 347
Cotton, Value of 125
Cottonseed, Value of 248
Cramer, Steward W., Elected Associate Member 158
Crank Shaft 345
Creep of Belts, W. W. Bird, . . 312
Creep of Belt, Loss due to . . . 314
Crop Reports, Government . . . 159
Crop Reports, Resolution on . . 171
Covel, Thomas D., Elected Active Member 154
Cummings, Robert A., Reinforced Concrete Applied to Factory Construction 290
Cummings, Robert A., Resolution of Thanks to 175

D

Danker, Daniel J., Member Committee on Meeting 88
Deming, Henry B., Elected Active Member 154
Delano, George, Elected Active Member 154
Depreciation 144
DeWolf, John O., Member Committee on Meeting 88
Dinner Lancashire Private Cotton Investigation Commission, 330
Directors, Increase in Number . 86
Disbursements of Association . . 110
Doggett, Charles S., Elected Active Member 154
Drake, Sir Francis, Monument to 349
Draper, Eben S., Address at Dinner Lancashire Private Cotton Investigation Commission 335
Draper, Eben S., Welcome to the Commonwealth 121
Draper, George Otis, Elected Director for Three Years . . 176
Draper, George Otis, Nominated Director for Three Years . . 173
Draper, Gen. William F., Remarks by, at Dinner of Lancashire Private Cotton Investigation Commission 350
Draper & Co., Extent of Introduction of Their Machinery . 346

E

Earnings of Association 110
Economy of Reinforced Concrete 297

Engineering Laboratories, Invitation to 120
English Operatives, Welfare of, 348
Estimates of Cotton Crop . . . 133
Export Trade, C. A. Greene . . 258
Export Trade Humbugs and Fallacies, Edwin Neville Vose, 199

F

Factory Construction, Reinforced Concrete Applied to, Robert A. Cummings 290
Federation of Spinner's Associations, H. W. Macalister . . . 219
Finance of Association, Table of 112
Fine Numbers, Spinning of . . 339
Fine Spinning 362
Fine Steel Wire 345
Fire-Resisting Construction . . 292
Firth Scholarship 100
Firth, William, Textile Scholarship 100
Fish, Charles H., Chairman Committee on Association Medal 99
Fish, Charles H., Chairman Committee on Nominations . 93
Fish, Charles H., Concrete Tanks 306
Fish, Frederick P., Resolution of Thanks to 174
Fish, Frederick P., Unity of Business Purpose 141
Foreign Trade 199
Forests, Reserve, Resolution on 114
Forest Reservation Resolution . 165
Formulæ for Reinforced Concrete 298
Forster, Benjamin, Elected Active Member 153
Foster, John W., Elected Active Member 154
Fowler, E. T., Elected Associate Member 158
Funds of Association 109

G

Gardner, Arnold C., Elected Active Member 155
Geographical List of Members . 43
German Cotton Growing in Africa 137
Ginning, Tare on 248
Government, Board of 10
Government Crop Reports . . . 129
Graham, J. Whidden, Elected Active Member 155
Grant, George P., Jr., Automatic Stokers 329
Grant, George P., Jr., Chairman Committee on Ballot 96
Grant, George P., Jr., Elected Director for Three Years . . . 176
Grant, George P., Jr., Nominated Director for Three Years . . 173
Grant, George P., Jr., Teller of Election 152
Green, C. A., Resolution of Thanks to 175
Green, C. A., Wider Markets for American Goods 258
Greene, Edwin Farnham, Member Committee on Meeting . . 88
Greene, Harry S., Elected Associate Member 158
Greene, Henry S., Elected Associate Member 158
Greer, William K., Elected Active Member 155
Greg, Henry P., Effect of Oil on Concrete 307
Greg, Henry P., Address at Dinner to Lancashire Private Cotton Investigation Commission 354
Greg, Henry P., Southern Journey 244
Grinnell, Russell, Elected Associate Member 158
Grinnell, Frederick, In Memoriam 67

Growth of Association 105
Government Crop Reports . . . 159
Guests at Dinner, April 26, 1906 331
Guests at Eightieth Meeting . . 82
Gustafson, Frank B., Elected Active Member 155

H

Hambly, Alton L. R., Elected Active Member 155
Hamilton, Alexander, One Factory in United States 347
Hampden County Spinners' Association 99
Hartshorne, William D., Buildings in San Francisco 310
Hartshorne, William D., Change of Name of Association . . . 95
Hartshorne, William D., Delegate to Cotton Conference of Growers and Manufacturers . 174
Hartshorne, William D., Elected Vice President 176
Hartshorne, William D., Nominated Vice President 173
Hartshorne, William D., Recipient of Association Medal . . 113
Hayes, Charles Jr., Elected Active Member 155
Heineken, William P., Elected Active Member 155
Hersom, Ernest L., Hollow Concrete Work 309
Hobbs, Franklin W., Elected Director for Three Years . . 176
Hobbs, Franklin W., Nominated Director for Three Years . . 173
Honorary Members 14
Hotel Brunswick, Lunch at . . . 88
Humidity, Effect Upon Cotton Bands 180
Humidity, Influence Upon the Power of Textile Mills 179
Huntington Hall, Meeting at . . 85
Hurd, George A., In Memoriam 71

I

Increase in Number of Directors 97
India, Concrete Tanks in, Louis Simpson 308
Industrial Interdependence, William Whitman 338
Influence of Humidity, Temperature, and Lubrication Upon the Power of Textile Mills, William F. Parish, Jr. 179
In Memoriam 67
International Congress at Bremen, Program of 229
International Federation of Master Cotton Spinners and Manufacturers' Associations, H. W. Macalister 219

J

Jamieson, Joseph B., Elected Active Member 155
Jillson, W. H., Elected Active Member 155
Jones' Stoker 321

K

Keables, Nelson D., Elected Active Member 155
Keep Commission 129
Kent, Hervey, In Memoriam . . 71
Knapp, S. A., on Cost of Cotton 139
Knight, Stephen A., Change of Name of Association . . . 95
Knight, Stephen A., Delegate to Conference of Cotton Growers and Manufacturers 174

Knight, Stephen A., Government Crop Reports 161
Knight, Stephen A., Reminiscenses of Seventy-one Years in the Cotton Spinning Industry 231

L

Labor Conditions in Mills . . . 231
Lancashire Private Cotton Investigation Commission, Dinner to 330
Lancashire Private Cotton Investigation Commission, Members of 330
Leather Belt, Modulus of Elasticity 314
Library Fund 109
Life Members 14
Life Members 100
Life Membership Fund 109
Location of Membership 65
Lord, Hartley L., Elected Active Member 155
Lovering, William C., Delegate to Conference of Cotton Growers and Manufacturers 174
Lubrication, Influence of, Upon the Power of Textile Mills, William F. Parish, Jr. 179

M

Macalister, H. W., Address at Dinner to Lancashire Private Cotton Investigation Commission 361
Macalister, H. W., International Federation of Master Cotton Spinners and Manufacturers' Associations 219
Macalister, H. W., Resolution of Thanks to 175
MacColl, James R., Address of Acceptance as President . . . 176
MacColl, James R., Address at Dinner to Lancashire Private Cotton Investigation Commission 333
MacColl, James R., Delegate to Conference of Cotton Growers and Manufacturers 174
MacColl, James R., Elected President 176
MacColl, James R., Government Crop Reports 161
MacColl, James R., Nominated President 173
MacColl, James R., President's Address 124
MacDonald, W. H., Elected Active Member 155
Maintainence of Telephone System 145
Makepeace, Charles A., Member Committee on Ballot 96
Manley, Fred B., Elected Active Member 155
Mansfield, Henry F., Elected Director for One Year 176
Mansfield, Henry F., Nominated Director for One Year 127
Manufacturers Raising Cotton . 138
Markets, Wider, for American Goods, C. A. Green 258
Martin, Albert G., In Memoriam 72
McArthur, Robert, Member Committee on Nominations . . . 93
McCaughey, Edward J., Elected Active Member 155
McEwen, Robert P., Elected Active Member 155
McIver, Edward Gordon, Recipient Student's Medal 100
Medal and Certificate Fund . . 109
Members, Alphabetical List of . 11
Members, Election of 152

Members, Geographical List of . 43
Membership of the Association, Table of 103
Membership, Increase in . . . 124
Membership, Number of 42
Menu at Dinner April 26, 1906 . 331
Metric System 281
Miller, Simon, Elected Active Member 155
Montgomery, J. R., Delegate to Conference of Cotton Growers and Manufacturers 174
Moores, George, Resolution of Thanks to 175
Moores, George, Vote of Thanks to 289
Moores, George, Weights and Measures Applied to Textile Numbering 280
Morgan, William F., Elected Active Member 155
Morison, George B., Member Committee on Meeting . . . 88
Mortgages on Plantations . . . 249
Museum of Fine Arts, Invitation to 92

N

Name, Change of 4
National Forest Reserves . . . 114
Necrology 102
Nelson, Hugh, Elected Associate Member 158
New England Telephone and Telegraph Company, Resolution of Thanks to 175
Nichols, William A., Elected Active Member 155
Nominations Committee 93
Normal Cotton Crop 130
Number of Members 42
Numbering, Textile Weights and Measures Applied to, George Moores 280
Numbers of Fine Cotton 339

O

Officers, Election of 173
Officers, Expiration of 93
Officers from First Organization 11
Olney, Louis Atwell, Elected Active Member 156
Orr, William J., Address at Dinner to Lancashire Private Cotton Investigation Commission 359

P

Paige, Calvin D., Elected Active Member 156
Paine, Sidney B., Member Committee on Association Medal . 99
Paine, Sidney B., Teller of Election 152
Parish, William F. Jr., Influence of Humidity, Temperature, and Lubrication Upon the Power of Textile Mills 179
Parker, Walter E., Crop Reports 171
Parker, Walter E., Member Committee on Association Medal 99
Peck, William E., Elected Active Member 156
Pierce, H. M., Elected Active Member 156
Periodicals 106
Phelps, Aaron C., Elected Active Member 156
Phipps, Benjamin, In Memoriam 73
Place, Robert, Elected Active Member 156

Plantations of Cotton 357
Planter's Expenses 239
Plunkett, Charles T., Chairman Committee on Meeting . . . 88
Porter, Frank, Jr., Elected Active Member 156
Power to Start Mills 181
Prendergast, James N., Elected Associate Member 158
President's Address, James R. MacColl 124
Prices of Cotton and Wool, Frank P. Bennett, Jr. 268
Pritchett, Henry S., Capitalizing Brains 116
Proceedings 75
Programme of Eightieth Meeting 89

Q

Quinn, F. J., Elected Active Member 156

R

Rabbeth Spindle, Cause of Increased Capacity 346
Railroad Mileage 343
Raising Cotton, Cost of, Eben C. Willey 237
Reinforced Concrete Applied to Factory Construction, Robert A. Cummings 290
Reminiscenses of Seventy-one Years in the Cotton Spinning Industry, Stephen C. Lowe . 231
Rennie, T. H., Address at Dinner to Lancashire Private Cotton Investigation Commission 377
Rennie, William H., Elected Active Member 157
Report of Committee on Baling, Ginning, and Handling of American Cotton 381
Report of Secretary 99
Report of Treasurer 108
Resolutions, Committee on . . . 165
Resolutions on Forest Reserves 114
Resolutions of Thanks to Speakers 175
Roberts, C. E., Auditor's Report 110
Robertson, George W., Elected Active Member 157
Roney Stoker 320
Rooney, Elwin H., Elected Associate Member 158
Rope Driving, Creep in, W. W. Bird 317
Rounds, Israel P., Elected Active Member 157

S

Sanford, Arnold B., Change of Name of Association 95
Sanford, Arnold B., Government Crop Reports 159
Sales, Frank A., Elected Active Member 157
Secretary's Report 99
Shaw, Frederick P., Elected Associate Member 159
Sheep, Census of 275
Sheep, Diminuition of 274
Sherman, Gen. William F., on Recollection of Names . . . 374
Shipments, Foreign 259
Simpson, Louis, on Concrete Tanks in India 308
Skinner, John, Elected Active Member 157
Smethurst, John, Unable to Attend Meeting 218

Smith, Archer J., Elected Active Member 157
Smith, Chauncey, The Economics of the Steam Engine . 341
Smith, Thomas F., on Belt Creep 317
Soudan Cotton 137
Soule, Rufus A., Elected Active Member 157
Spindles, Increase in 125
Spinning, Evolution of 142
Spinning, Fine Thread 339
Squantum Club, Invitation of, to Dinner, to the Lancashire Private Cotton Investigation Commission 373
Starting Load 181
Statistical Year for Cotton, Change of 382
Steel Crank Shaft 345
Steel Value of any Watch . . . 345
Stephans, Jacob, Elected Associate Member 159
Stokers, Elwood E. Taylor . . . 318
Strength of Reinforced Concrete 294
Student's Medal 99
Student's Medal Fund 109

T

Taber, Frederick, Elected Active Member 157
Tariff Laws, Committee on . . . 172
Tariff Revision 127
Taxation of Colleges 119
Taylor, Elwood E., Automatic Stokers 318
Taylor Gravity Under-Feed Stoker 324
Technology, Massachusetts Institute, Meeting at 85
Technology, Massachusetts Institute of, Resolution of Thanks to 175
Telephone Companies, Resolution of Thanks to 175
Telephone, Number of Messages 143
Telephone Services, Complimentary 92
Telephone Switchboard 145
Telephone System, Maintenance of 145
Temperature, Influence of, Upon the Power of Textile Mills, William F. Parish, Jr. 179
Textile Scholarship Fund . . . 109
Thissell, Earl A., Member Committee on Ballot 96
Tompkins, Daniel A., Address at Dinner to Lancashire Private Cotton Investigation Commission 371
Tompkins, Daniel A., Government Crop Reports 161
Tompkins, Daniel A., Relations with China 166
Trade Humbugs and Fallacies. Edwin Neville Vose 199
Transactions of Technical Societies 106
Treasurer's Report 108
Tribute of Europe to American Cotton Crop 347
Tucker, Frank S., Elected Active Member 157

U

Unger, Fred, Elected Active Member 157
Under-Feed Stoker, Elwood E. Taylor 324
Unity of Business Purpose, Frederick P. Fish 141

V

Vibration Resisted by Reinforced Concrete 295
Vose, Edwin Neville, Resolution of Thanks to 175
Vose, Edwin Neville, Some Export Trade Humbugs and Fallacies 199

W

Washington Conference of Cotton Growers and Manufacturers 174
Wasserman, Joseph, Elected Active Member 157
Watt, James, Inscription to . . 340
Weights and Measures Applied to Textile Numbering, George Moores 280
Welcome to the Commonwealth, Eben S. Draper 121
Welcome from Institute of Technology 116
West Africa Cotton Growing . . 136
White Mountain Forest Reserves, Resolution on 114
Whitehead, W. T., Elected Active Member 157
Whitman, Clarence, Elected Active Member 157
Wire, Steel 345
Witherbee, Rex G., Elected Active Member 157
Witherbee, Rex G., Recipient of Student's Medal 100
Whitman, Gilbert P., On Low Grade Cotton 375
Whitman, William, Address at Dinner to Lancashire Private Cotton Investigation Commission 338
Whitman, William, Industrial Interdependence 338
Wider Markets for American Goods 258
Willard Hotel, Conference of Cotton Growers and Manufacturers at 174
Willey, Eben C., Cost of Raising Cotton 237
Williams, Franklin D., Member Committee on Meeting . . . 88
Wood, William P., Elected Active Member 158
Woodbury, C. J. H., Address at Dinner of Lancashire Private Cotton Investigation Commission 374
Woodbury, C. J. H., Delegate to Conference of Cotton Growers and Manufacturers 174
Woodbury, C. J. H., Secretary's Report 99
Woodbury, C. J. H., Treasurer's Report 108
Woodrow, Marcus J., Elected Active Member 157
Wool, Advance in Price of . . . 269
Wool Growing, Centralization of 271
Wool, Value of 125
Wright, George W. Elected Active Member 158

Y

Yarn Tables 287

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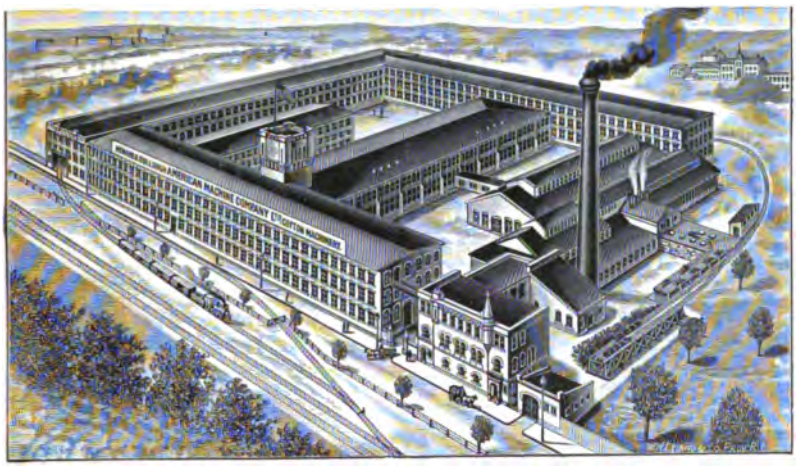

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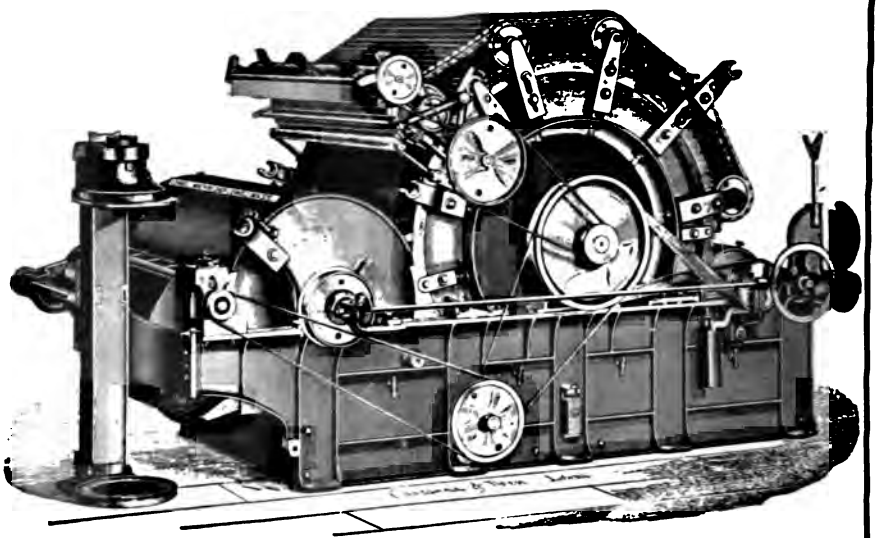

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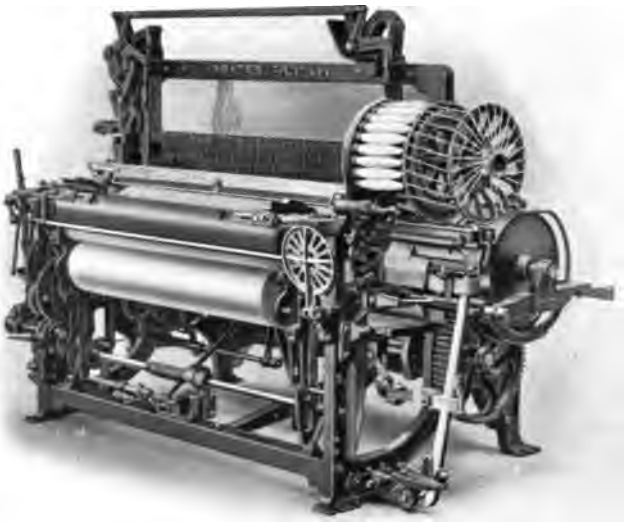

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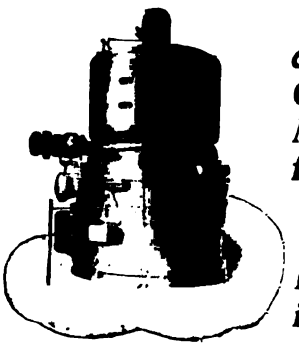

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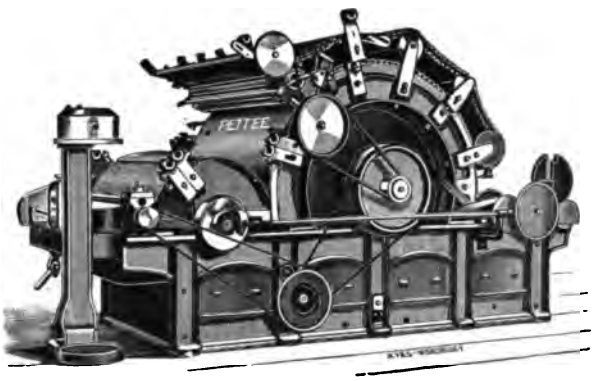

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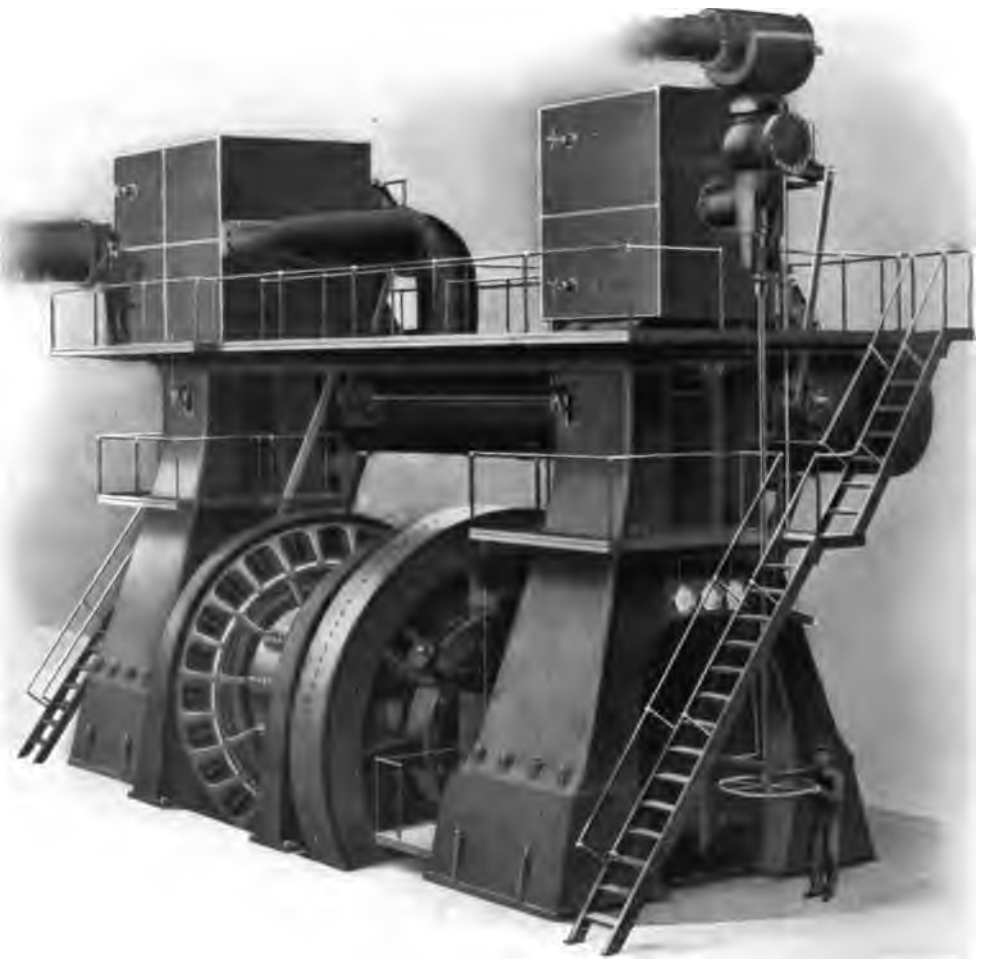

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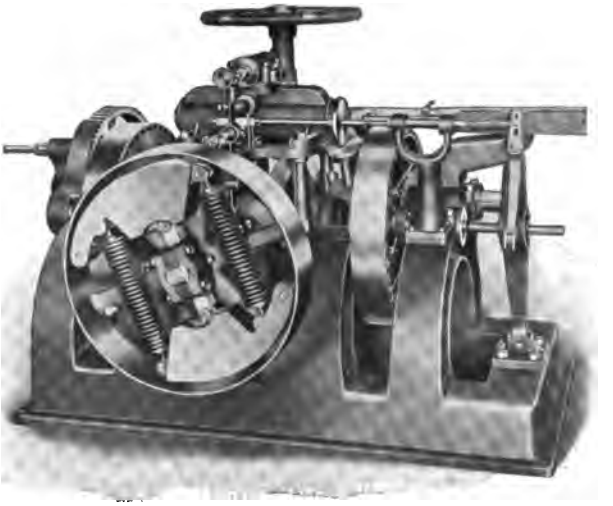

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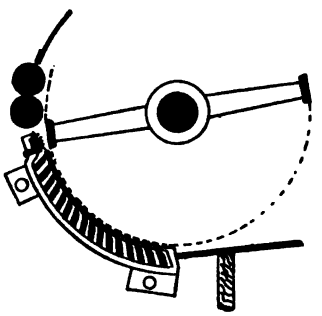

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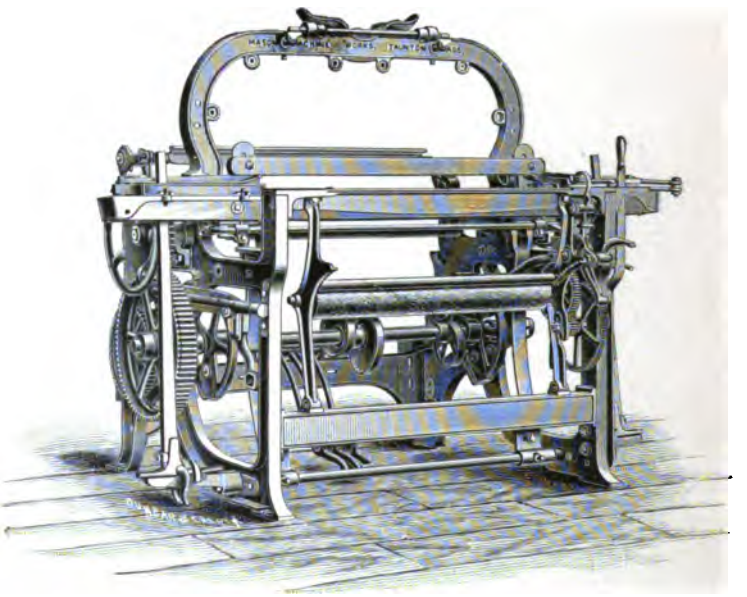

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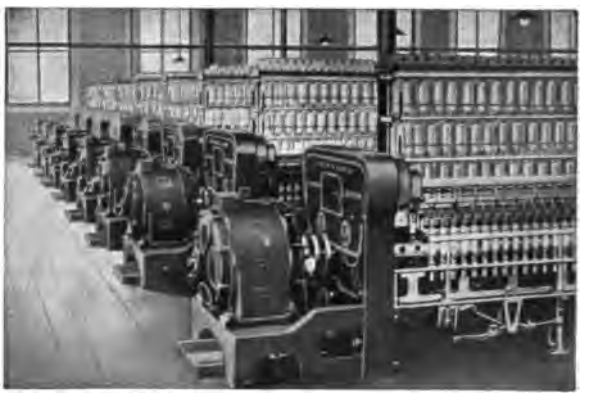

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